CiteSpace 介绍及导用

主讲人：聂茶庚

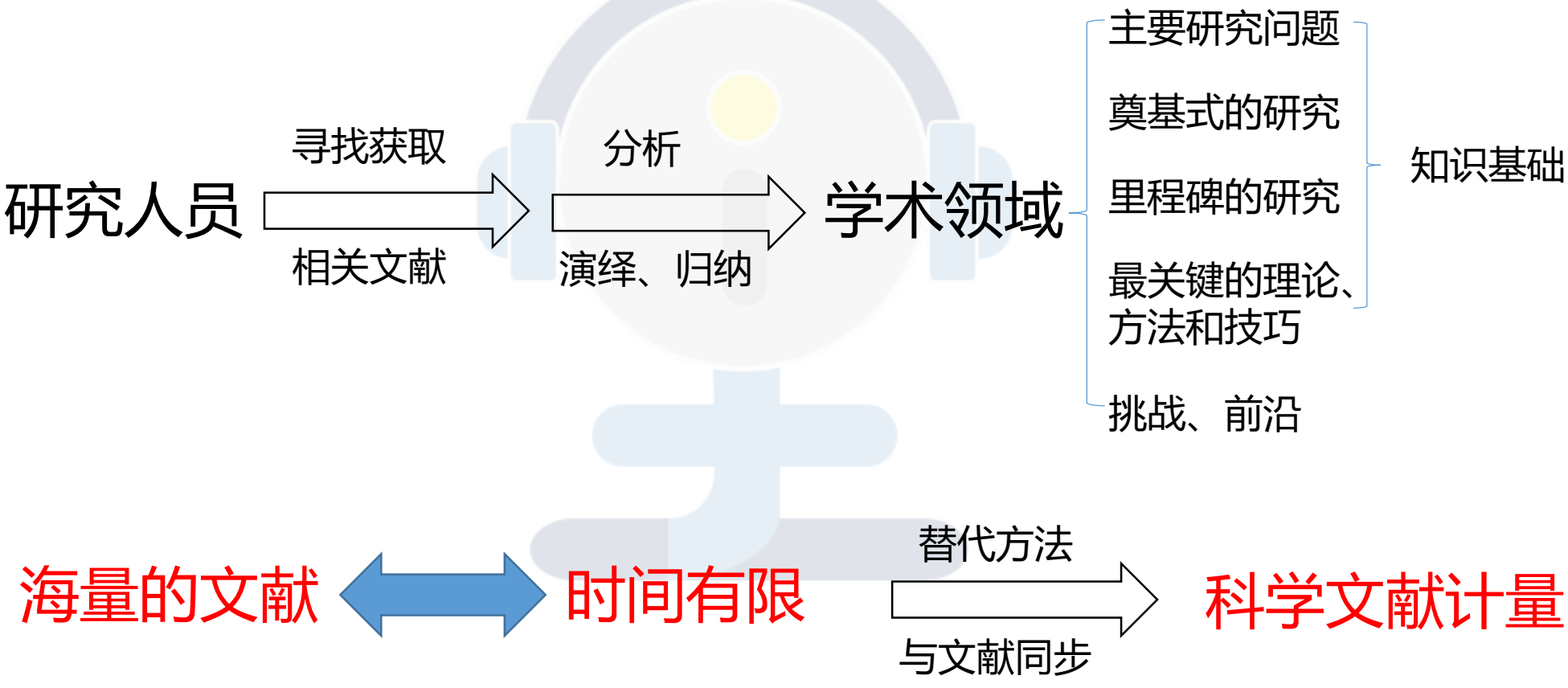
1 扫码签到，累积图书馆积分，获取定制纪念品

2 讲座预告——微信公众号“i学堂XMU”

3 i学堂QQ交流群：312168713

目录

传统的研究模式


研究人员
寻找获取
相关文献
分析
演绎、归纳
学术领域
主要研究问题
奠基式的研究
里程碑的研究
最关键的理论、方法和技巧
挑战、前沿
知识基础
海量的文献
时间有限
替代方法
与文献同步
科学文献计量

传统的研究模式

系统综述 → 主要研究问题
奠基式的研究
里程碑的研究
最关键的理论、方法和技术
挑战、前沿
（以上为知识基础）

问题：
- 没有系统综述（新兴研究领域）
- 已有的系统综述已过时
- 已有的系统综述不涉及你的研究兴趣

已有的系统综述已过时 → 替代方法 / 与文献同步 → 科学文献计量

CiteSpace

1

从大数据的角度归纳现有的国内外研究文献

2

从时间维度展现学术演变的动态进程

3

突出核心作者和关键词

4

呈现研究者和机构的发文及合作的地理空间分布

一 CiteSpace介绍

01 CiteSpace开发

- 由美国德雷克赛尔大学（费城）信息科学与技术学院（The College of Information Science and Technology, Drexel University）Dr. ChaomMei Chen研究开发

http://blog.sciencenet.cn/home.php?mod=space&uid=496649

- 基于JAVA的应用软件

03 CiteSpace特点

- CiteSpace是近年来信息分析领域最具影响力的信息可视化软件
- 强大的文献共被引分析功能，且随着不断的发展算法，功能不断优化
- 被广泛应用于WoS分类类别的研究领域

04 使用CiteSpace进行文献研究发表的论文及引用

Web of Science™ 检索 Research Assistant 登录 注册

检索 › citespace (主题) AND 2004-2024 (出版年) 的结果

菜单

5,230 条来自 Science Citation Index Expanded (SCI-Expanded), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Conference Proceedings Citation Index – Science (CPCI-S), Conference Proceedings Citation Index – Social Sciences & Humanities (CPCI-SSH), Emerging Sources Citation Index (ESCI)的结果:

citespace (主题) and 2004-2024 (出版年) 复制检索式链接

+ 添加关键词 快速添加关键词: + citespace + vosviewer + bibliometric analysis + visualization analysis + bibliometrics + research hotspots

5,230 Documents 您可能也想要... 分析检索结果 引文报告 创建跟踪服务

精炼检索结果 Export Refine

在结果中检索...

快速过滤

- 高被引论文 58
- 热点论文 3
- 综述论文 1,768
- 在线发表 160

0/5,230 添加到标记结果列表 导出 日期: 降序 1 / 105

1 Global research trends in traditional Chinese medicine therapy for acute leukemia: a comprehensive visualization and bibliometric analysis

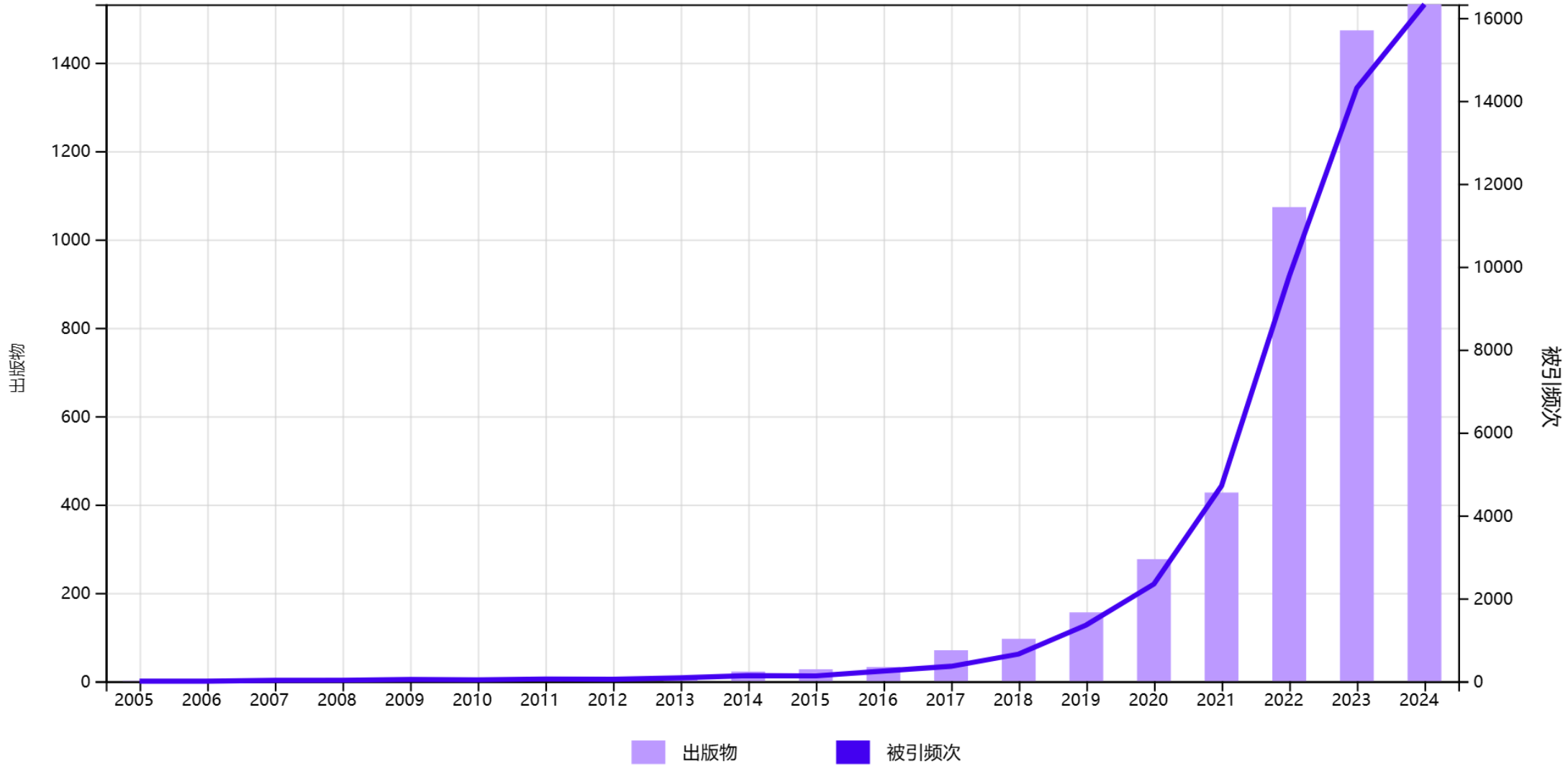
Zhang, WW; Zhang, KL; (...); Zhang, GF

Dec 31 2024 | HEMATOLOGY 29 (1)

36 参考文献

被引参考文献深度分析

05 使用CiteSpace进行文献研究发表的论文及引用



06

使用CiteSpace进行文献研究的论文

显示 25 共计 212 条目 /254

全选	字段: Web of Science 类别	记录数	5,230的百分位
☐	Environmental Sciences	734	14.034%
☐	Medicine General Internal	336	6.424%
☐	Green Sustainable Science Technology	287	5.488%

07 CiteSpace的用户在全球的分布

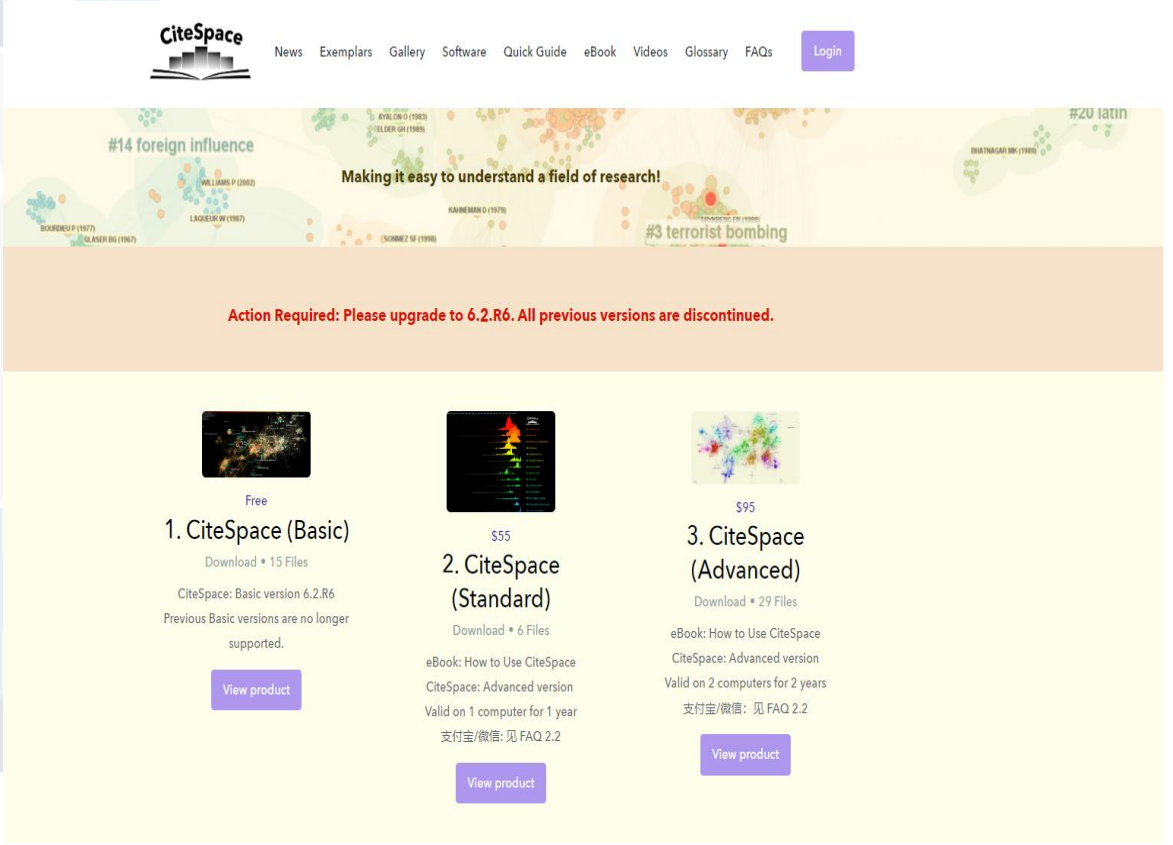
http://blog.sciencenet.cn/u/ChaomeiChen

过去16年，CiteSpace的应用呈显著增长趋势，应用遍布54个国家或地区，涉及337个不同的城市。在CiteSpace的应用中，VOSviewer和Histcite是常常结合使用的软件，Web of Science是主要数据源。CiteSpace全球应用特征与核心功能演化. DOI: 10.13266/j.issn.2095-5472.2023.025

02 CiteSpace的获取与安装

http://cluster.ischool.drexel.edu/~cchen/citespace/download/

https://citespace.podia.com/



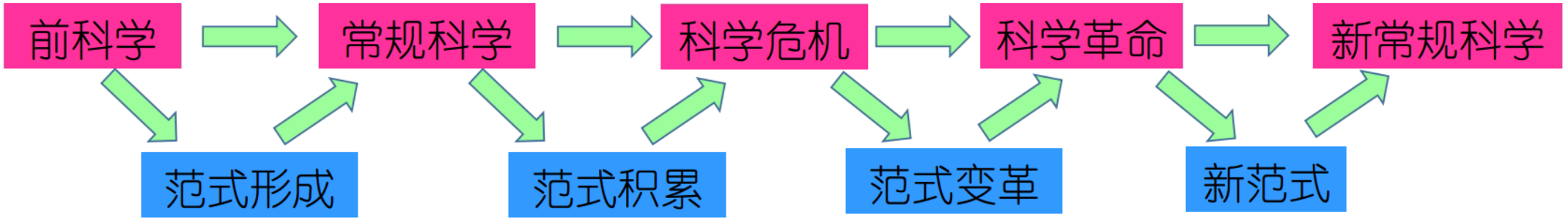
二 CiteSpace理论基础

01 CiteSpace理论基础

1 库恩的科学革命的范式转换理论

托马斯·库恩认为，科学推进是建立在不断的科学革命过程之中，人们通过科学革命而接纳新观点——新旧科学范式的交替和兴衰。 CiteSpace中体现为一个又一个时间段所出现的主题聚类。

KUHN T S. The Structure of Scientific Revolutions [M]. Chicago: University of Chicago Press, 1962.



T.S.Kuhn (1962). 科学革命的结构

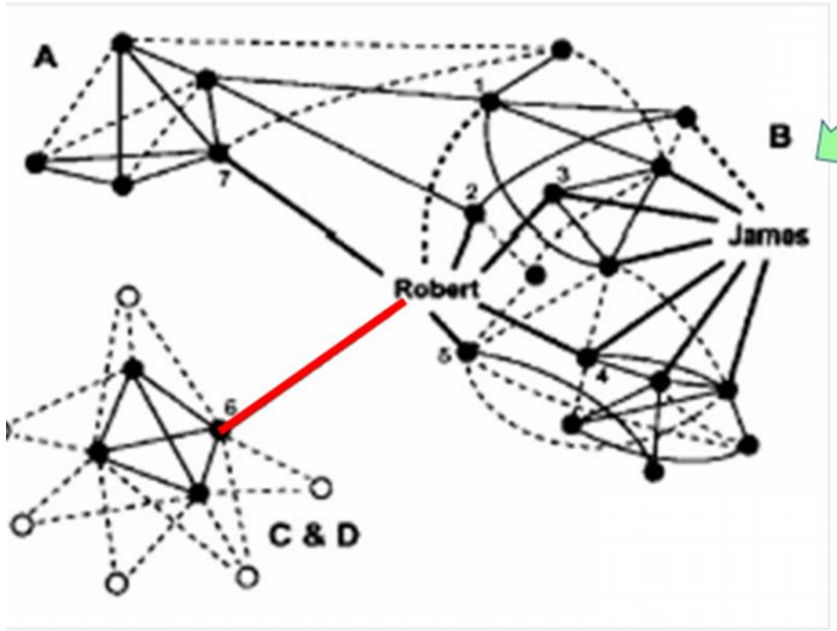
2 Burt的结构洞理论

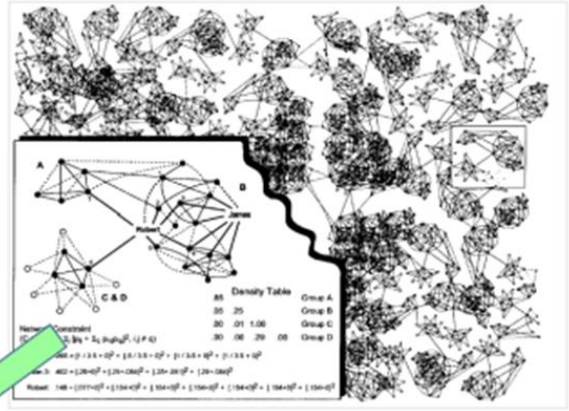
芝加哥大学罗纳德·Burt在研究社会网络和社会价值时提出——人们在社会网络中的位置在于他们的意见和创意的质量。 CiteSpace中体现为寻找具有高度中介中心性。

BURT R S. Structural holes and good ideas [J]. American Journal of Sociology, 2004, 110(2): 349-99.

BURT R S. Structural Holes: The Social Structure of Competition [M]. Cambridge, Massachusetts: Harvard University Press, 1992.

结构洞(structural holes)





结构洞是“社会网络中的某个或某些个体和有些个体发生直接联系，但与其他个体不发生直接联系，无直接联系或关系间断(disconnection)的现象，从网络整体看好像网络结构中出现了洞穴”。

3 Pirolli提出的最优信息觅食理论

解释信息搜索中人们如何做出决定

PIROLLI P. Information Foraging Theory: Adaptive Interaction with Information [M]. Oxford, England: Oxford University Press, 2007.

4 Kleinberg的探测频率突增的算法

一篇论文的引文频次突然呈现急速增长——最合理的解释就是这篇论文切中了学术领域这个复杂系统中的某个关键点

KLEINBERG J. Bursty and hierarchical structure in streams [M]. Proceedings of the 8th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. Edmonton, Alberta, Canada; ACM Press. 2002: 91-101.

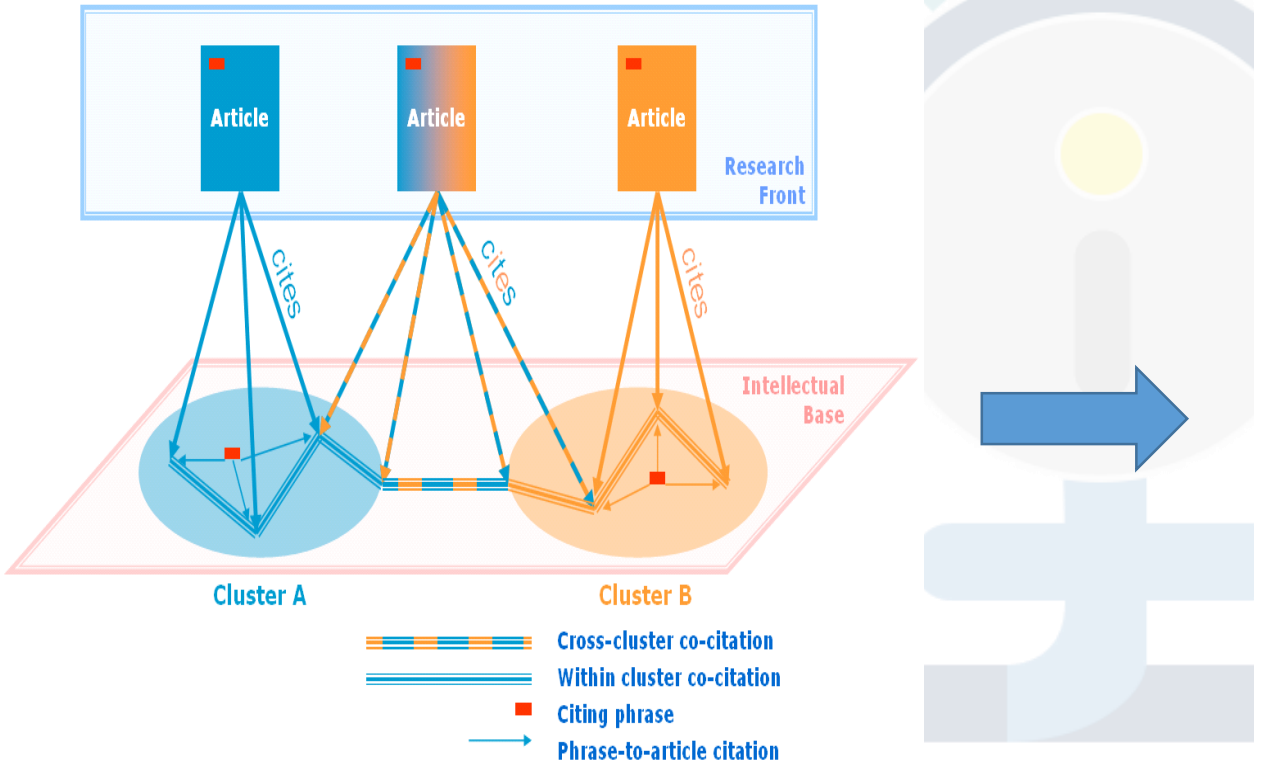
5 结构变异理论

网络的模块化是对其整体结构的一个全局性量度。局部结构的变化可能会引起全局的改变，但是也同样可能不会引起任何全局上的改变。

CHEN C M. Predictive Effects of Structural Variation on Citation Counts [J]. Journal of the American Society for Information Science and Technology, 2012, 63(3): 431-49.

CHEN C. The Fitness of Information: Quantitative Assessments of Critical Evidence [M]. Hoboken, New Jersey, USA:Wiley, 2014.

02 CiteSpace概念模型



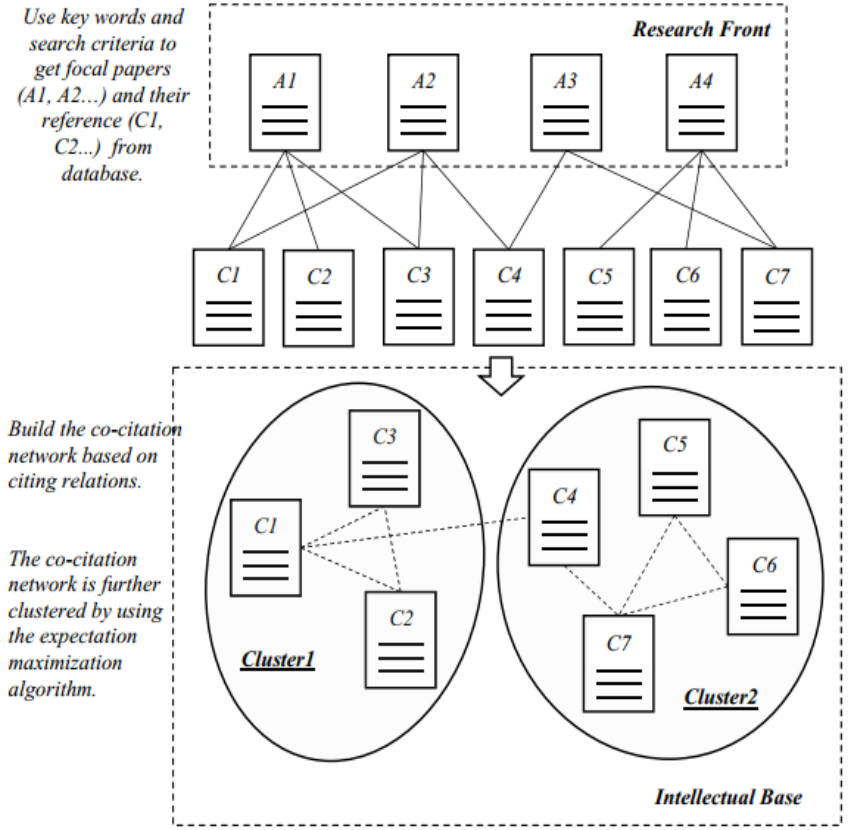
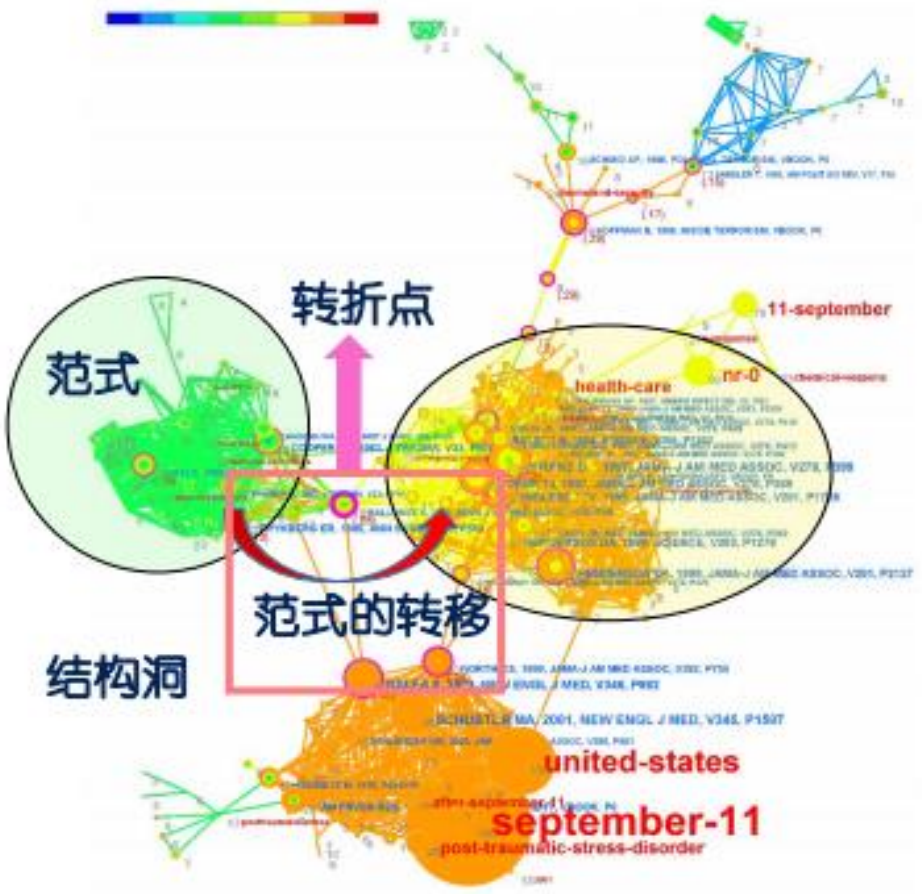


Fig. 1. The conceptual frame work of the co-citation network.

03 科学知识图谱可视化表达-CiteSpace



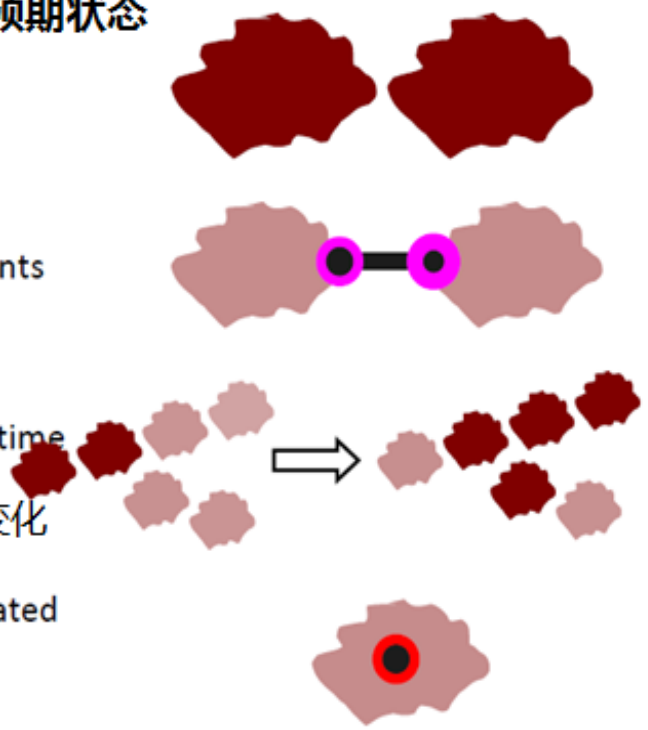
Terrorism Research

陈超美，绘制

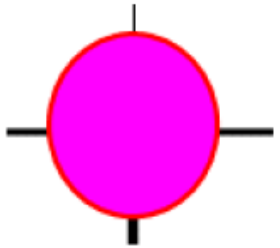
04 CiteSpace分析结果的呈现

Expected Patterns 预期状态

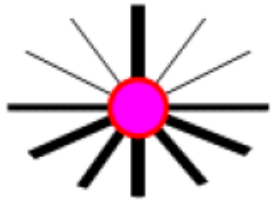
- Thematic grouping
  主题分组
- Intellectual turning points
  转折点
- Thematic change over time
  主题随着时间的推移变化
- Abrupt changes associated with triggers
  触发性的研究突变



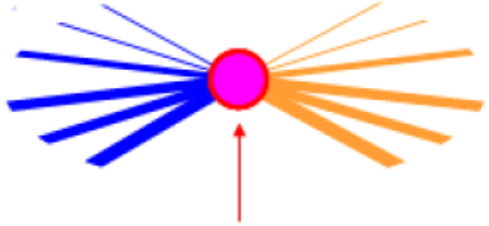
CiteSpace



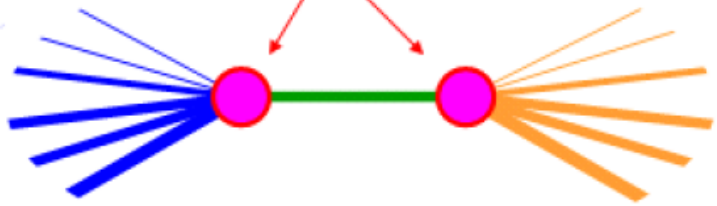
Landmark node
large radius



Hub node
large degree



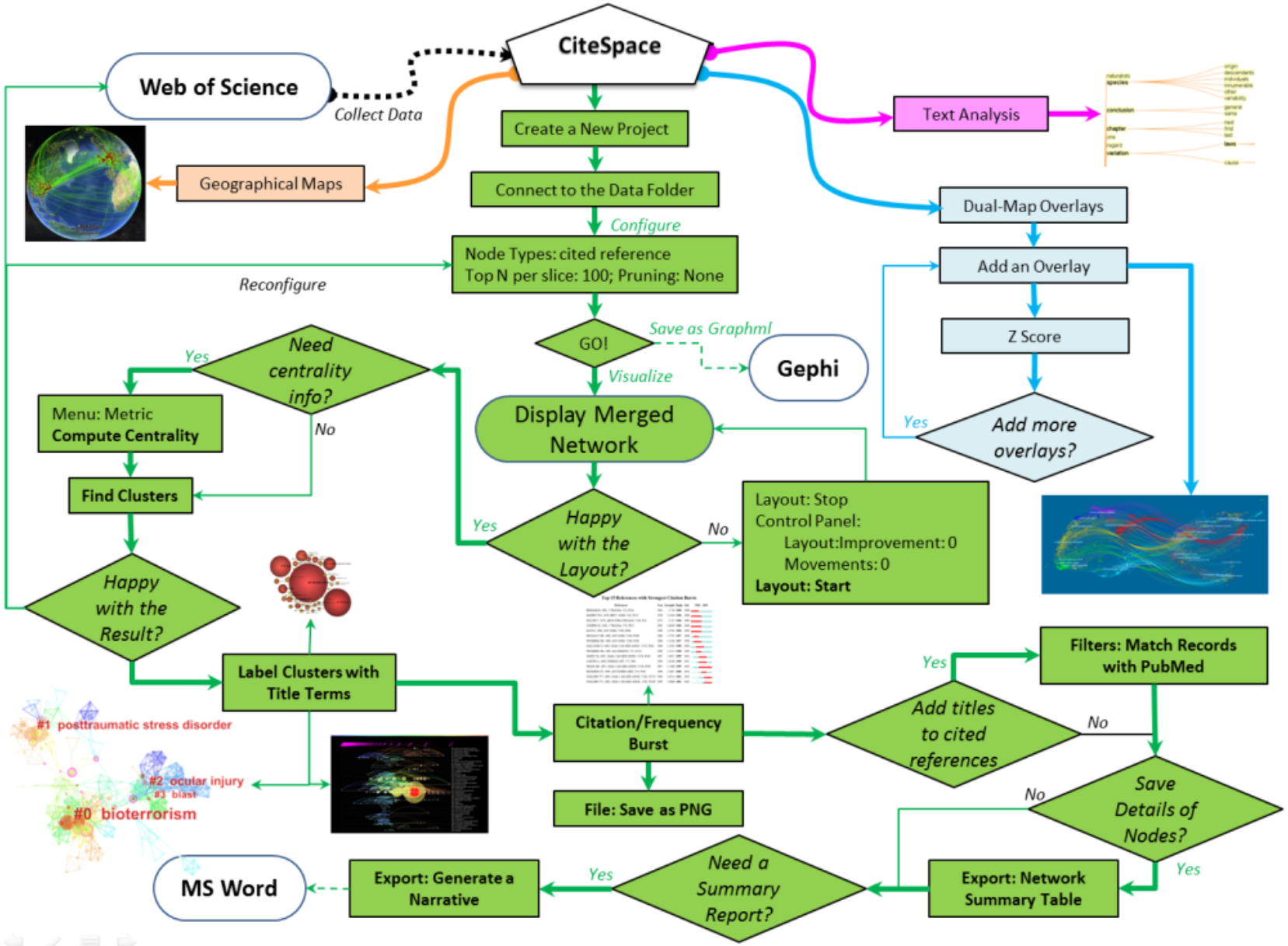
Pivot node
exclusive joints of clusters or network patches



三

CiteSpace进行文献分析步骤

01 CiteSpace分析流程



02 数据来源

- **Web of Scienc**
- **CSSCI(**Chinese Social Science Citation Index)
- **CNKI**
- **CSCD**
- **Pubmed**
- **Derwent**
- **Scopus**
- **arxiv e-Print**
- **CSV**
- **EndNote**

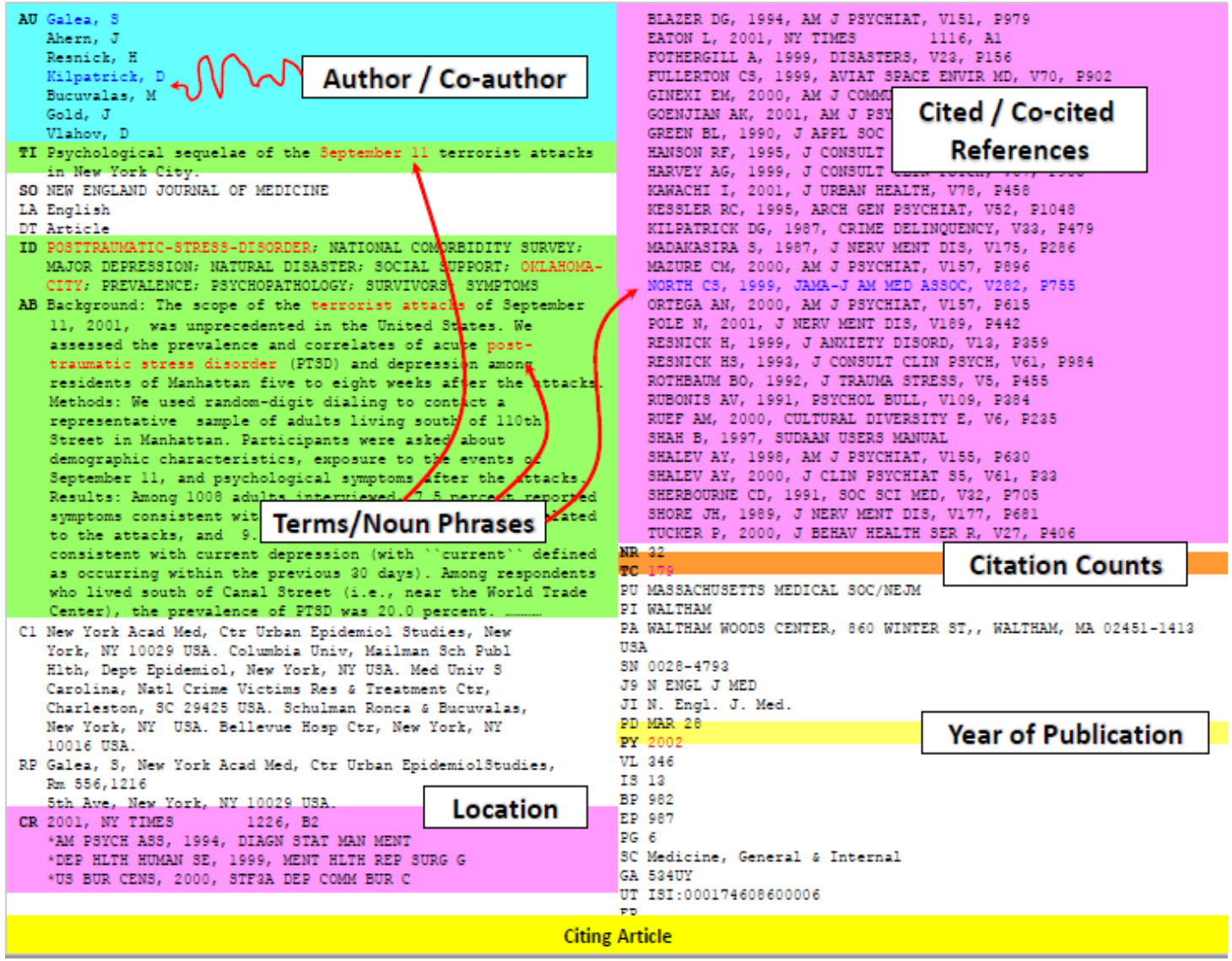
02 数据来源

各数据库可供分析的功能

功能 / 数据源	合作网络			共现分析			共被引			文献耦合	双图叠加
	作者	机构	国家/地区	关键词	术语	领域	文献	作者	期刊		
Web of Science	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Scopus☆	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓
Derwent☆	✓	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗
CNKI☆	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗
CSSCI☆	✓	✓	✗	✓	✗	✓	✓	✓	✓	✗	✗
CSCD	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓	✗
RCI	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗

03

CiteSpace分析的对象——文献题录信息



03 CiteSpace分析的对象——文献题录信息

co-authorship

co-occurring burst terms

```
AU Galea, S
   Ahern, J
   Resnick, H
   Kilpatrick, D
   Bucuvalas, M
   Gold, J
   Vlahov, D
TI Psychological sequelae of the September 11 terrorist attacks
   in New York City.
SO NEW ENGLAND JOURNAL OF MEDICINE
LA English
DT Article
ID POSTTRAUMATIC-STRESS-DISORDER; NATIONAL COMORBIDITY SURVEY;
   MAJOR DEPRESSION; NATURAL DISASTER; SOCIAL SUPPORT; OKLAHOMA-
   CITY; PREVALENCE; PSYCHOPATHOLOGY; SURVIVORS; SYMPTOMS
AB Background: The scope of the terrorist attacks of September
   11, 2001,  was unprecedented in the United States. We assessed the
   prevalence and correlates of acute post-traumatic stress disorder (PTSD)
   and depression among residents of Manhattan five to eight weeks after the
   attacks.  Methods: We used random-digit dialing to contact a
   representative  sample of adults living south of 110th Street in Manhattan.
   Participants were asked about demographic characteristics, exposure to the
   events of September 11, and psychological symptoms after the attacks.
   Results: Among 1008 adults interviewed, 7.5 percent reported symptoms
   consistent with a diagnosis of current PTSD related to the attacks, and
   9.7 percent reported symptoms consistent with current depression (with
   ``current`` defined as occurring within the previous 30 days). Among
   respondents who lived south of Canal Street (i.e., near the World Trade
   Center), the prevalence of PTSD was 20.0 percent. ……
```

03 CiteSpace分析的对象——文献题录信息

```
CR 2001, NY TIMES          1226, B2
   *AM PSYCH ASS, 1994, DIAGN STAT MAN MENT
   *DEP HLTH HUMAN SE, 1999, MENT HLTH REP SURG G
   *US BUR CENS, 2000, STF3A DEP COMM BUR C
   BLAZER DG, 1994, AM J PSYCHIAT, V151, P979
   EATON L, 2001, NY TIMES          1116, A1
   FOTHERGILL A, 1999, DISASTERS, V23, P156
   FULLERTON CS, 1999, AVIAT SPACE ENVIR MD, V70, P902
   GINEXI EM, 2000, AM J COMMUN PSYCHOL, V28, P495
   GOENJIAN AK, 2001, AM J PSYCHIAT, V158, P788
   GREEN BL, 1990, J APPL SOC PSYCHOL, V20, P1033
   HANSON RF, 1995, J CONSULT CLIN PSYCH, V63, P987
   HARVEY AG, 1999, J CONSULT CLIN PSYCH, V67, P985
   KAWACHI I, 2001, J URBAN HEALTH, V78, P458
   KESSLER RC, 1995, ARCH GEN PSYCHIAT, V52, P1048
   KILPATRICK DG, 1987, CRIME DELINQUENCY, V33, P479
   MADAKASIRA S, 1987, J NERV MENT DIS, V175, P286
   MAZURE CM, 2000, AM J PSYCHIAT, V157, P896
   NORTH CS, 1999, JAMA-J AM MED ASSOC, V282, P755
   ORTEGA AN, 2000, AM J PSYCHIAT, V157, P615
   POLE N, 2001, J NERV MENT DIS, V189, P442
   RESNICK H, 1999, J ANXIETY DISORD, V13, P359
   RESNICK HS, 1993, J CONSULT CLIN PSYCH, V61, P984
   ROTHBAUM BO, 1992, J TRAUMA STRESS, V5, P455
   RUBONIS AV, 1991, PSYCHOL BULL, V109, P384
   RUEF AM, 2000, CULTURAL DIVERSITY E, V6, P235
   SHAH B, 1997, SUDAAN USERS MANUAL
   SHALEV AY, 1998, AM J PSYCHIAT, V155, P630
   SHALEV AY, 2000, J CLIN PSYCHIAT S5, V61, P33
   SHERBOURNE CD, 1991, SOC SCI MED, V32, P705
   SHORE JH, 1989, J NERV MENT DIS, V177, P681
   TUCKER P, 2000, J BEHAV HEALTH SER R, V27, P406
```

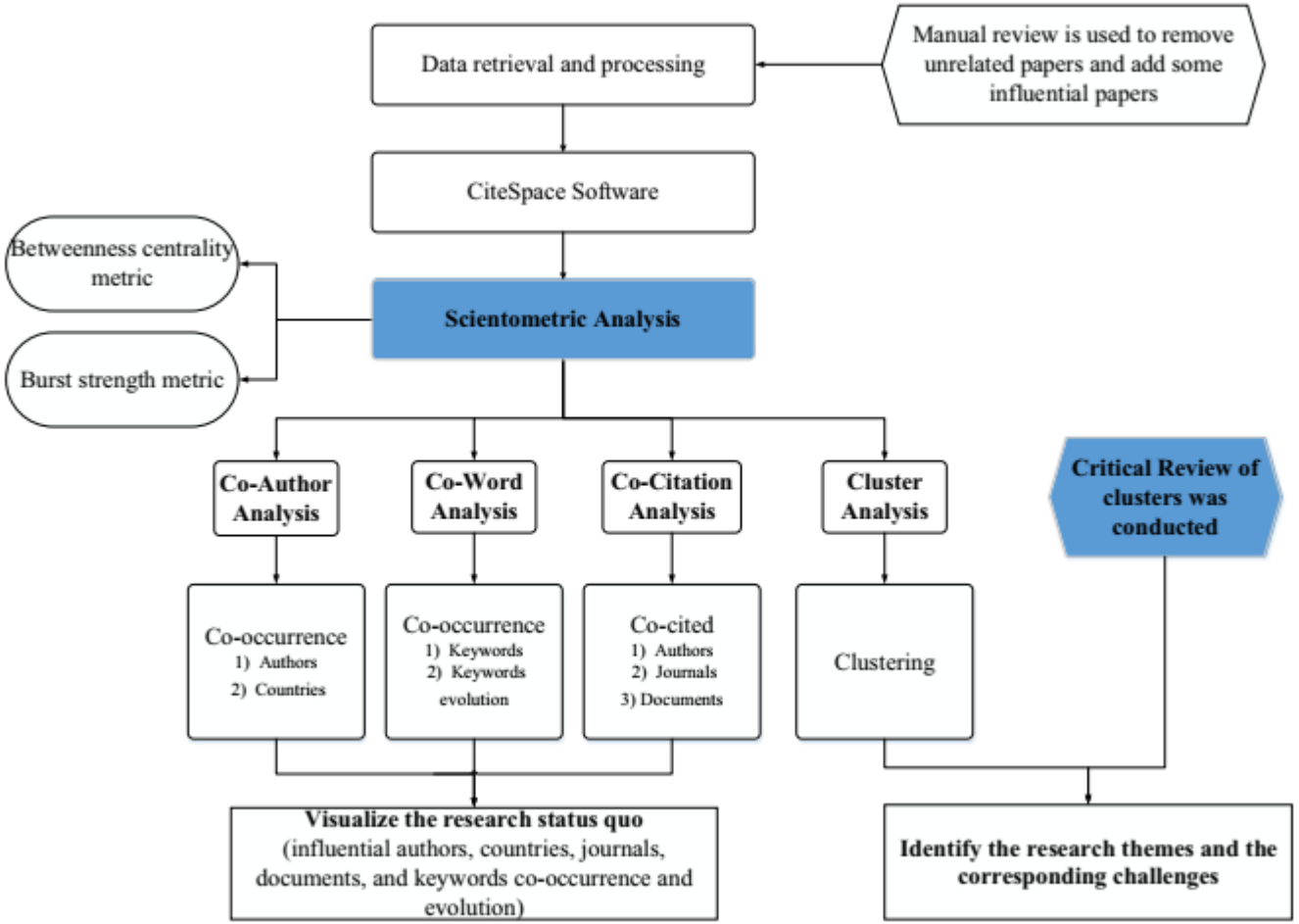
author co-citation

document co-citation

journal co-citation

ACA/DCA/JCA

03 CiteSpace分析的对象——小结



数据采集

- **Web of Scienc**
- **CSSCI(**Chinese Social Science Citation Index)
- **CNKI**

04 数据采集及预处理

无需无止境地优化搜索查询以剔除无关主题的文章，相反，**CiteSpace**可以在聚类过程中区分这些论文。

Chen C. 2018. How to use CiteSpace. Available at http://leanpub.com/howtousecitespace.

04 数据采集及预处理

Web of Science

04 数据采集及预处理

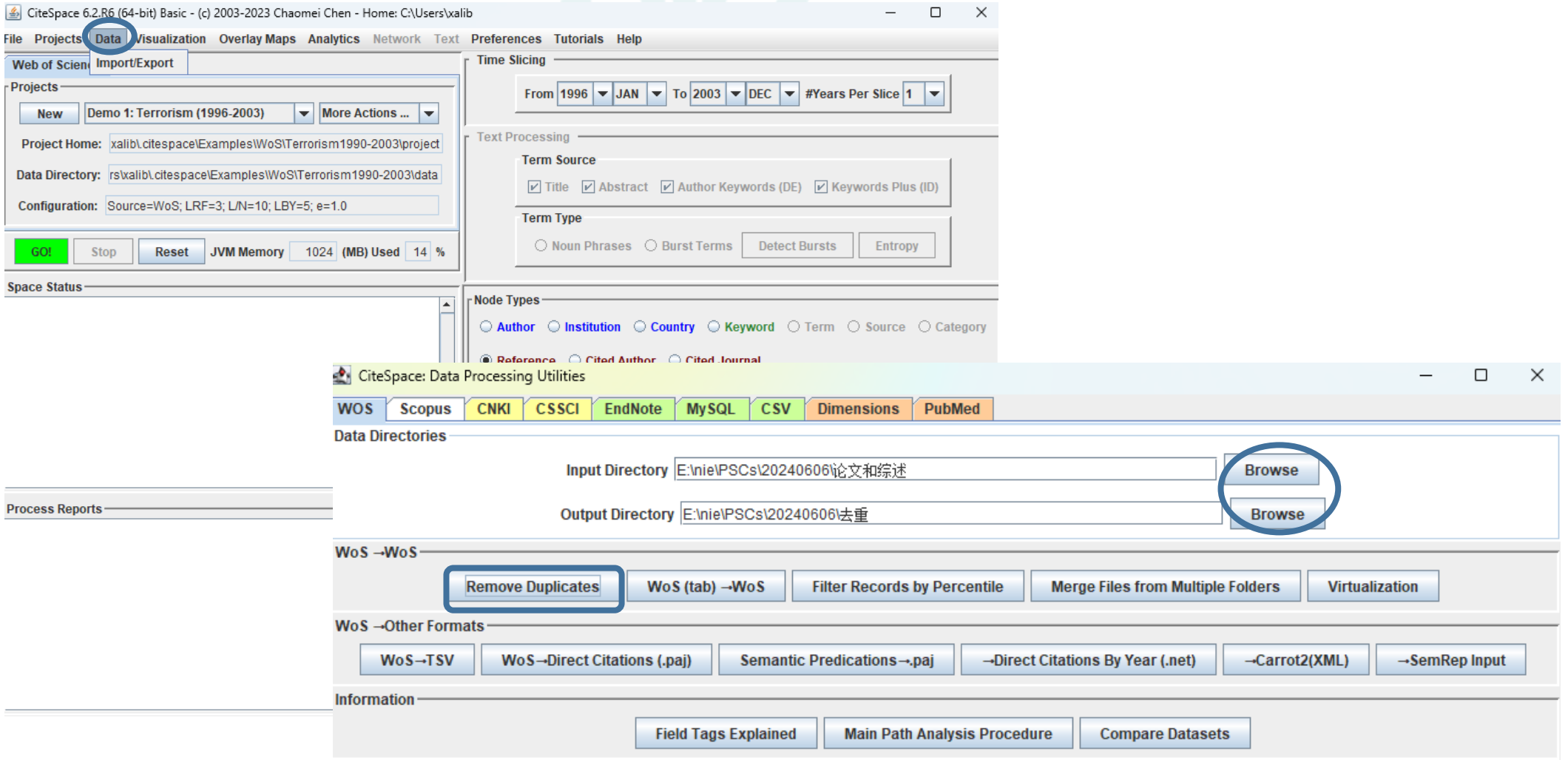
Web of Science

04 数据采集及预处理


aerogel
搜索 aerogel
文件名(N): download1-500.txt
保存类型(T):
Download*.txt
必须以此方式命名文件
浏览文件夹(B)
保存(S)
取消

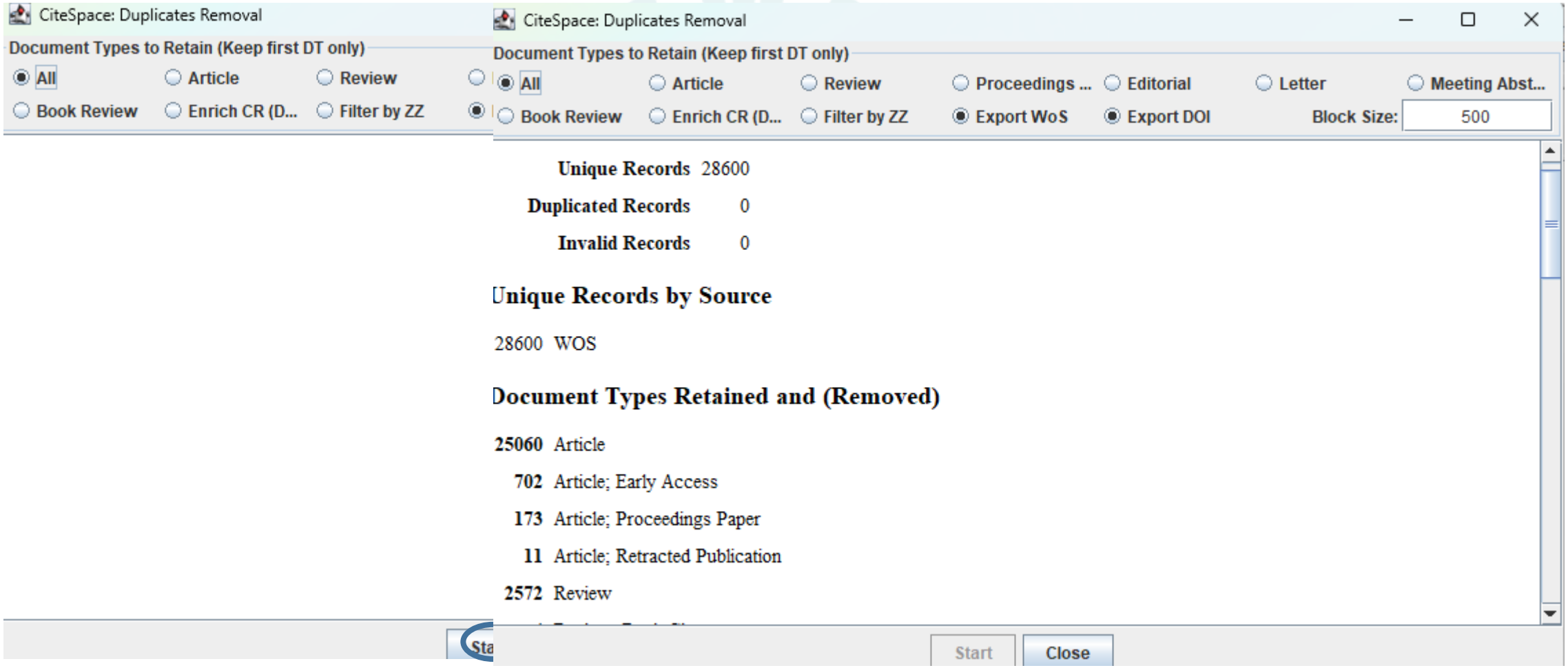
04 数据采集及预处理

数据去重



04 数据采集及预处理

数据去重



04 数据采集及预处理

CSSCI

1、登录cssci

04 数据采集及预处理

2、进入检索页面

以《科学学研究》为例，收集其2023-2024年的数据

04 数据采集及预处理

3、检索结果

04 数据采集及预处理

4、选择并下载数据

点击全部选择按钮，cssci一次最多下载500条记录，点击下载，直到下载完所有记录

☑ 9	郑佳佳	区际CO2排放不平等性及与收入差距的关系研究－－基于中国省际数据的分析
☑ 10	熊磊 /吴晓波 /朱培忠 /陈小玲	技术能力、东道国经验与国际技术许可－－境外企业对中国企业技术许可的实证研究
☑ 11	吴利华 /纪静	中美电子信息制造业产业环境比较分析－－基于关联产业的视角
☑ 12	曾国屏 /林菲	创业型科研机构初探
☑ 13	薛元昊 /王重鸣	基于组织学习理论的企业知识产权策略研究
☑ 14	樊路青 /刘雯雯	“二元论”视角下的技术获取战略与吸收能力－－基于中国经验的实证研究
☑ 15	孙永磊 /党兴华 /宋晶	网络惯例形成的影响因素探索及实证研究
☑ 16	阿儒涵 /李晓轩	我国政府科技资源配置的问题分析－－基于委托代理理论视角
☑ 17	王瑜 /任浩	模块化组织价值创新:内涵与本质
☑ 18	张文红 /赵亚普 /陈爱玲	外部研发机构联系能否提升企业创新？－－跨界搜索的中介作用
☑ 19	张爱琴 /侯光明 /李存金	面向工程技术项目的群体创新方法集成研究
☑ 20	王建 /胡珑瑛 /马涛	联盟网络中企业创新平衡模式选择的影响研究－－基于网络结构的视角

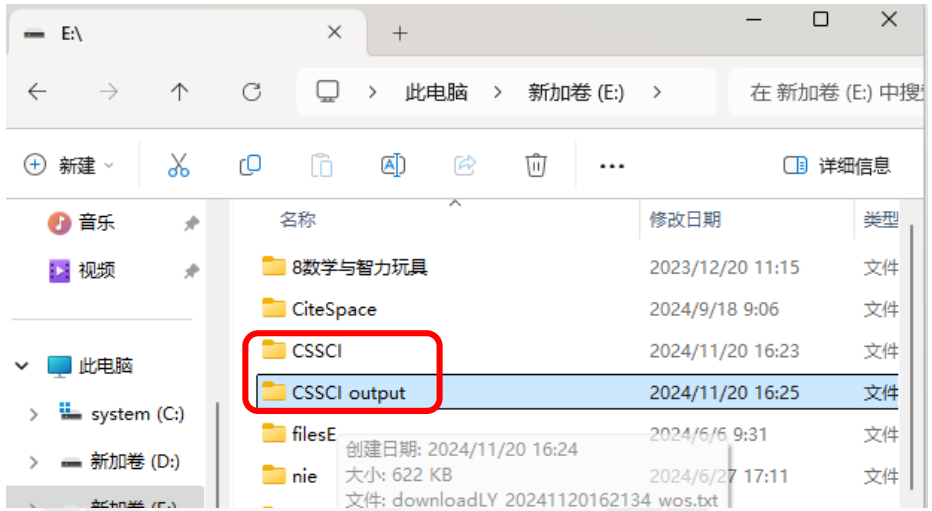
☑ 全部选择 显示 下载 收藏

04

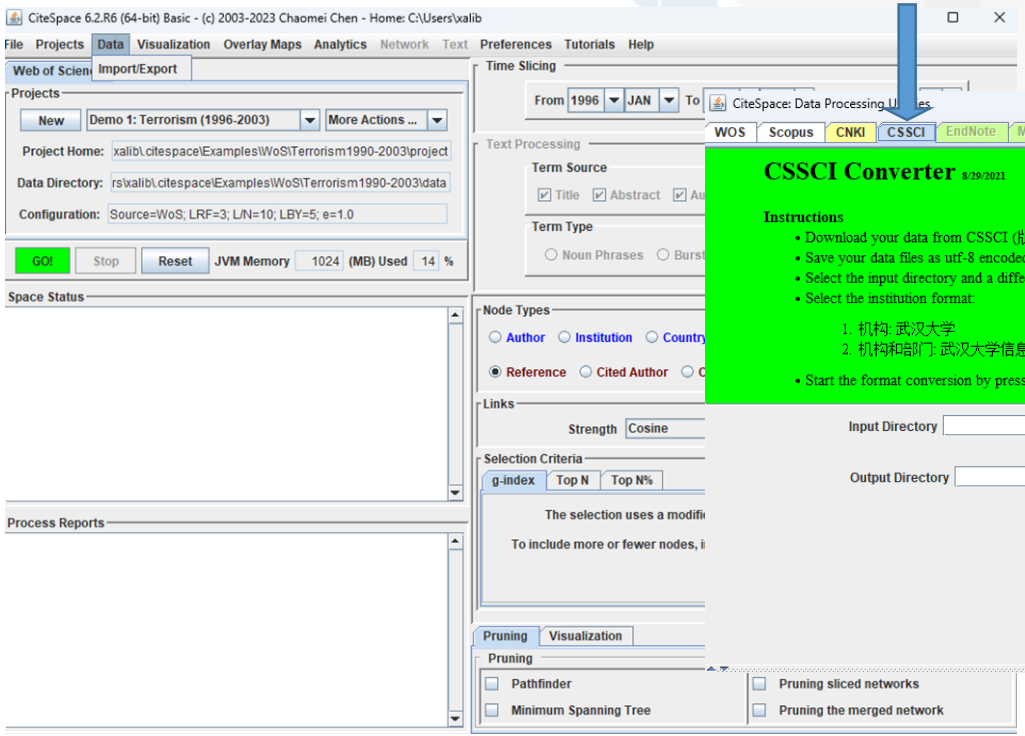
数据采集及预处理

6、数据转换

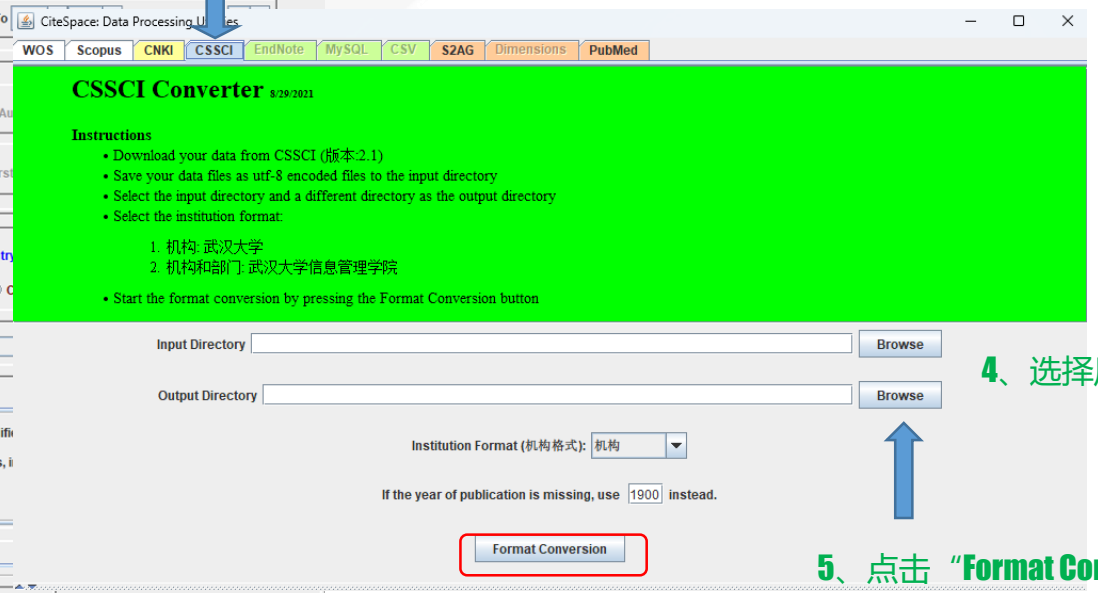
1、为原始数据和转换后数据分别建立文件夹



2、导入数据



3、选择**cssci**



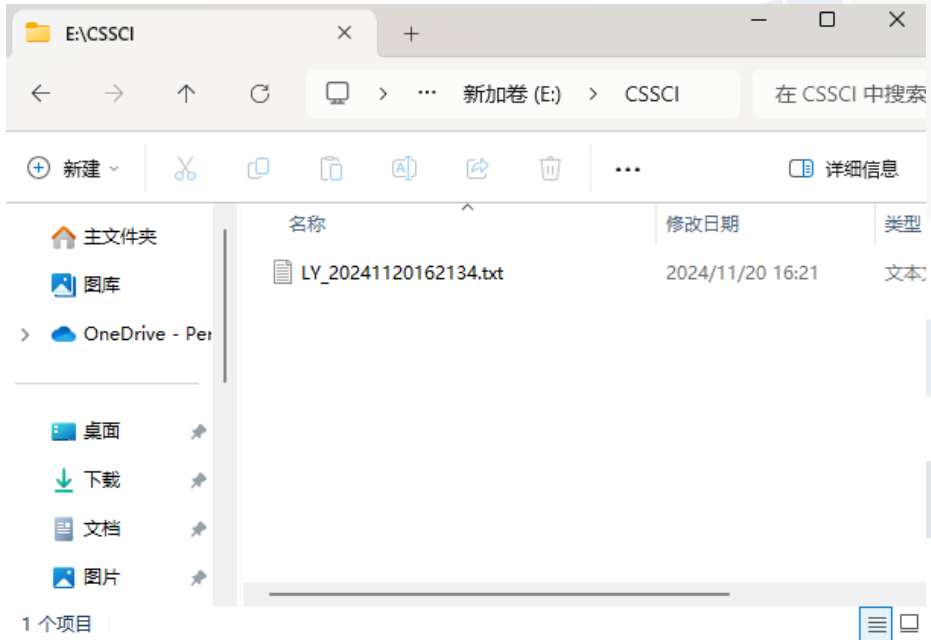
4、选择原始数据夹和转换后数据夹

5、点击“**Format Conversion**”，完成转换后会显示“**Finished**”

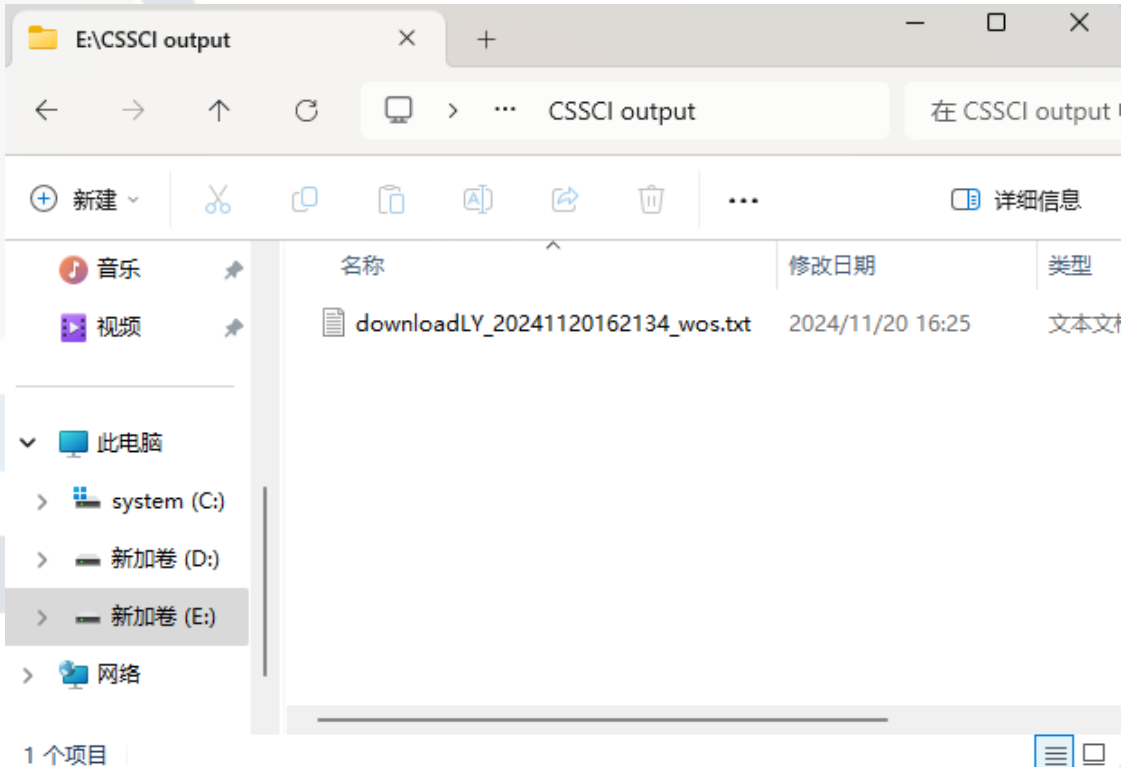
04 数据采集及预处理

1、数据转换结果

转换前



转换后

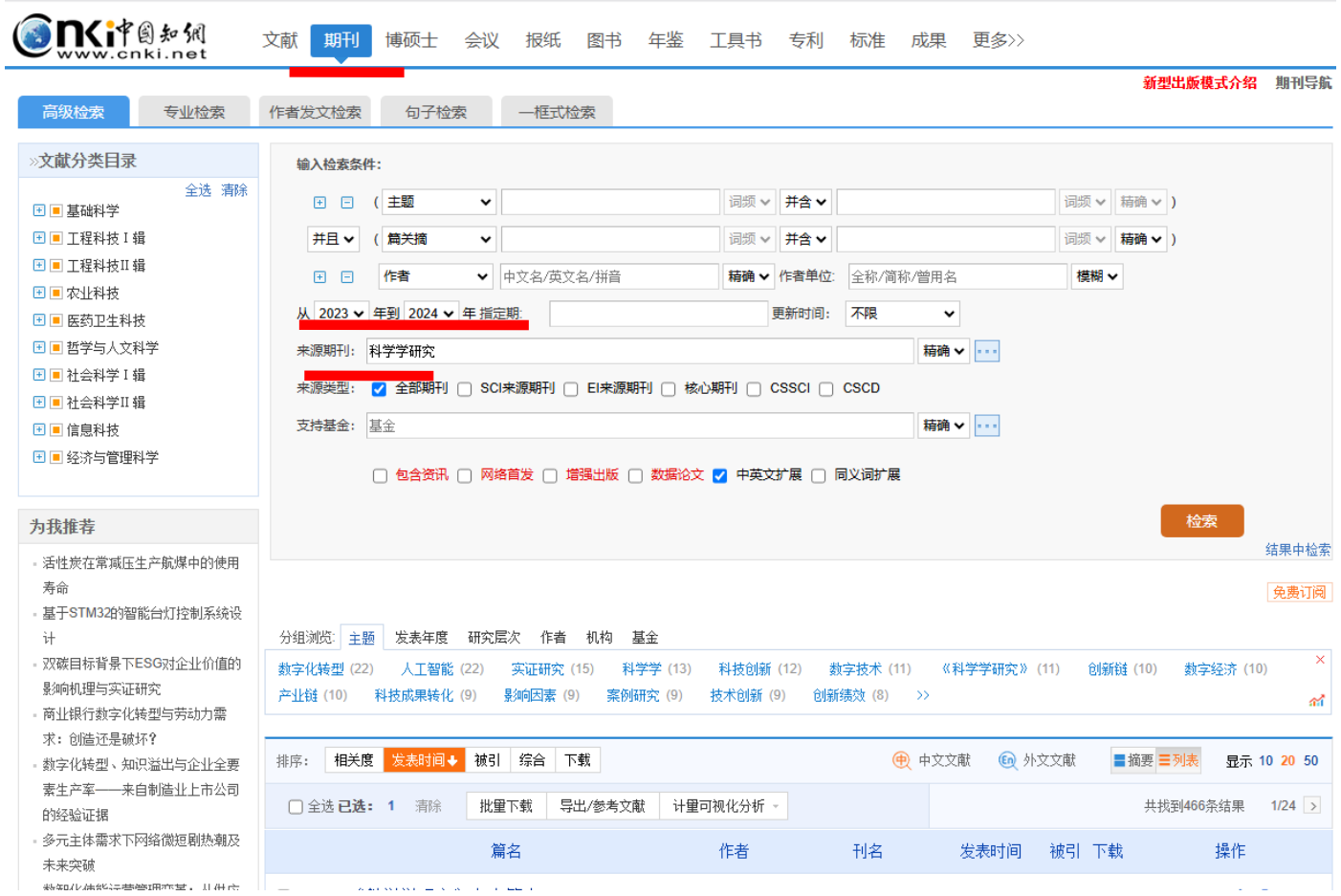


04 数据采集及预处理

CNKI

1、登录CNKI → 2、进入期刊检索页面

以《科学学研究》为例，收集其**2023-2024**年的数据



需要注意的是**CNKI**没有文献类型的分类，而检索的结果中新闻、会议通知等信息需要在数据收集时删除。因此需要进行手工删除，建议可以在下载时逐页检查。

04 数据采集及预处理

3、导出数据

筛选出**455**篇

04 数据采集及预处理

选择所有筛选出的453篇文献，再点击“导出/参考文献”，进入文献输入界面，此时需要选择输入数据的类型。

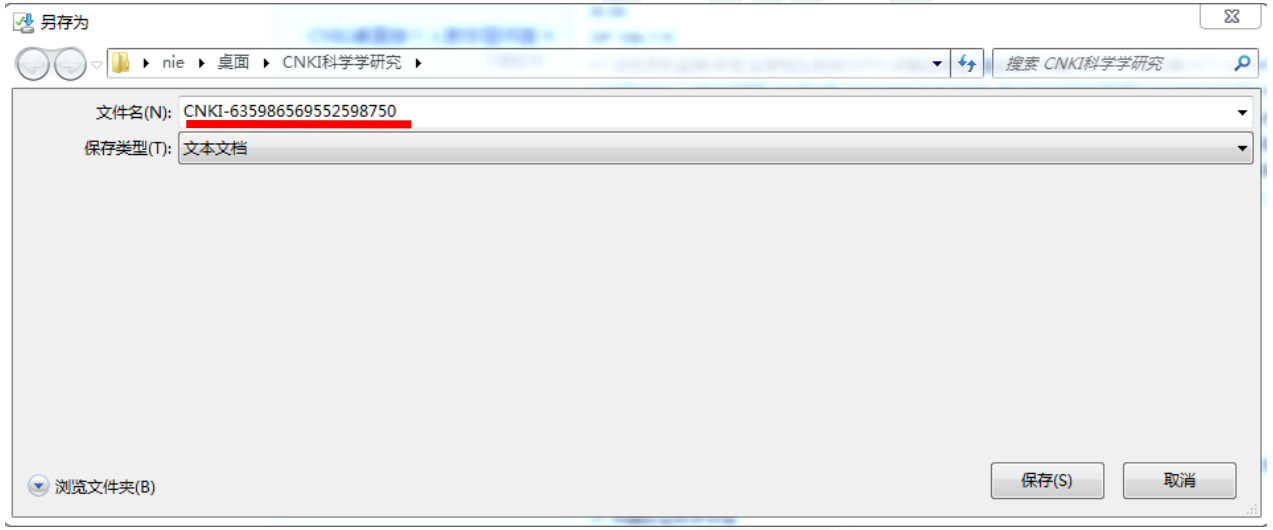
使用CiteSpace进行分析的文献类型输入为“Refworks”。建议输入“Refworks”和“Endnote”两种格式。前者可以进行文献可视化分析，而后者可以用于进行论文写作时使用。

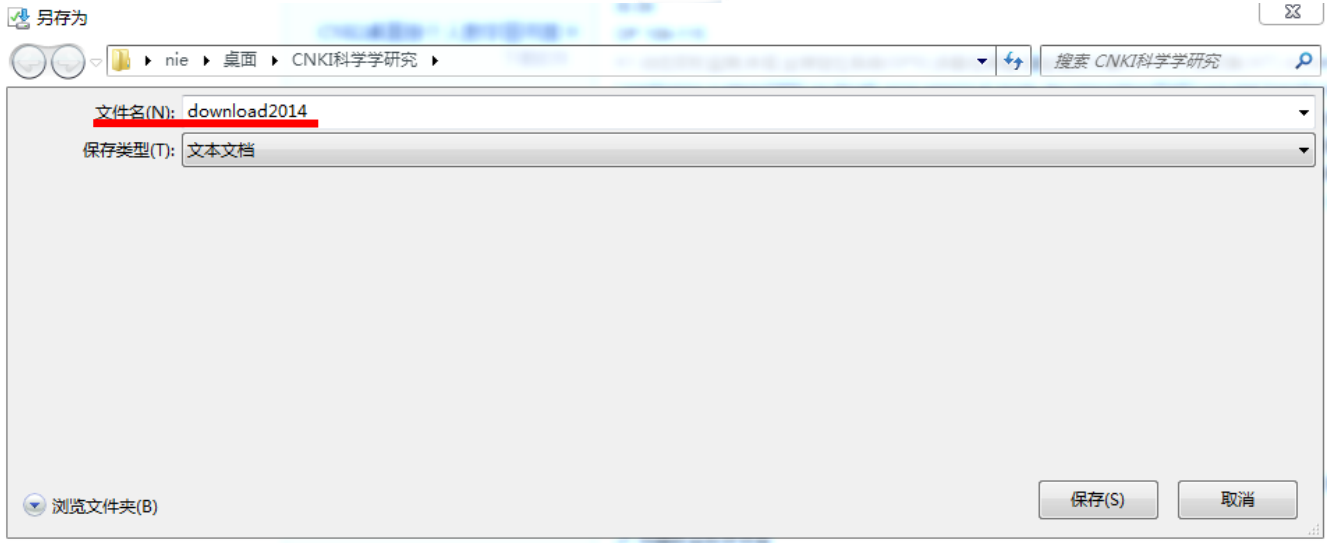
04 数据采集及预处理

点击“导出”下载数据。**CNKI**可以一次下载**500**条数据

04 数据采集及预处理

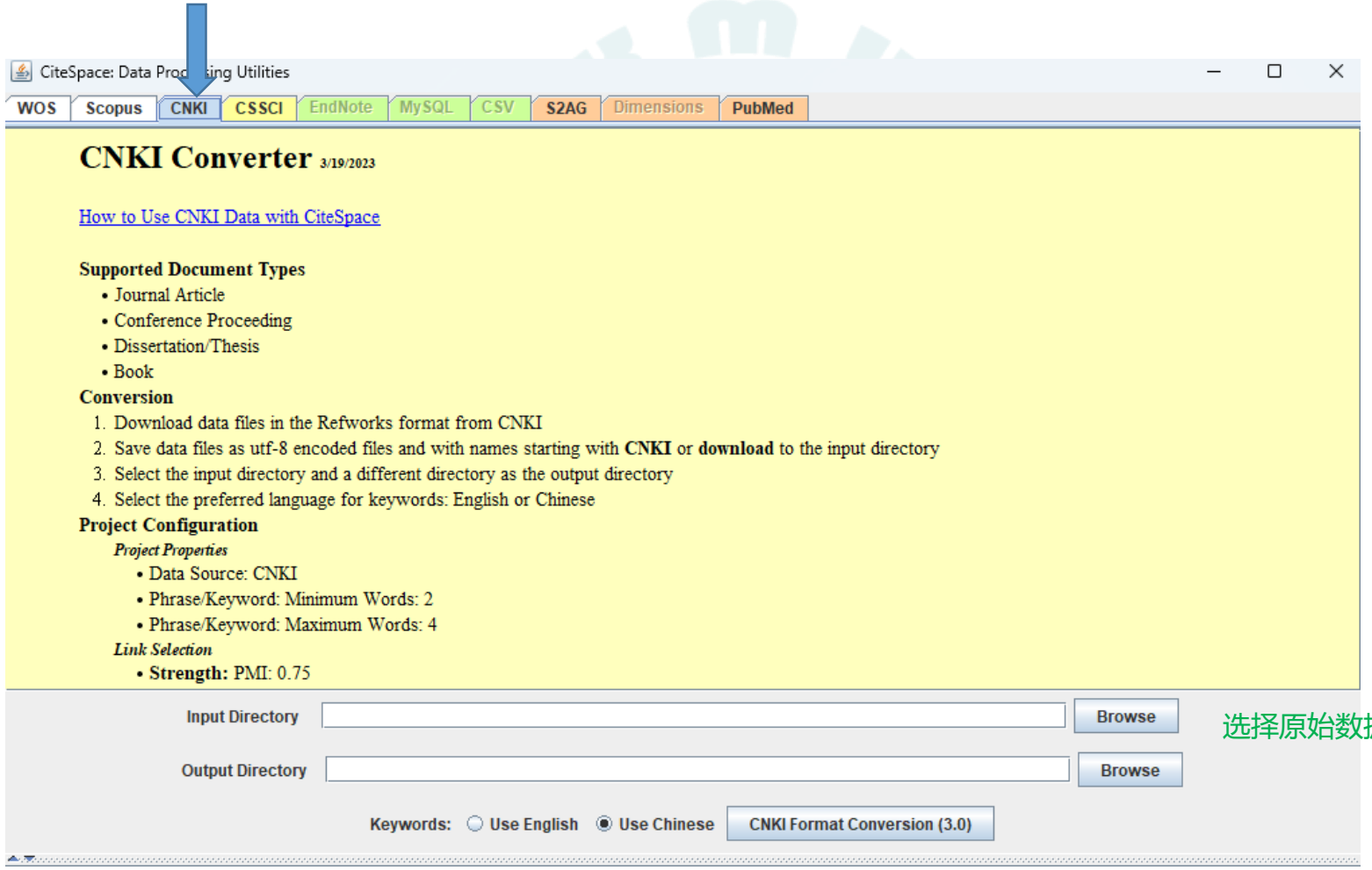
4、保存数据以download*.txt命名





04 数据采集及预处理

5、数据转换



选择原始数据夹和转换后数据夹

05

Citespace操作界面

运行CiteSpace

CiteSpace (c) 2003-2024 Chaomei Chen. All rights reserved.

English

6.4.R1 Demo Video * **CiteSpace Survey** * **CiteSpace Blogs**

Current Versions: 6.4.R1 (Advanced), 6.3.R3 (Advanced)

CiteSpace101 (Experimental GPT) | **CiteSpace FAQ in English/Chinese (英文/中文)**

Videos:(1) Visual Analytic Studies of Science (2024) (2) 研究领域的形成，发展，和消亡 (2022) (3) Delineating the Scholarly Landscape of a Research Field (2021)

Upgrade to CiteSpace (Advanced): 1 Year on 1 Computer; 2 Years on 2 Computers

升级高级版: 微信/支付宝（$/¥）： 1 年 1 台电脑; 2 年 2 台电脑

注意： CiteSpace的官网为citespace.podia.com。 任何其它网站均未经授权。

Warning: The citespace.podia.com is the official website of CiteSpace. CiteSpace distributed on any other websites are unauthorized.

System Information

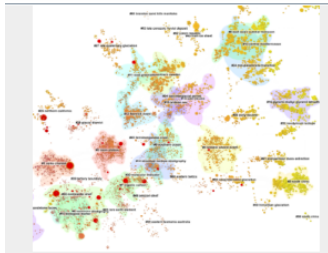
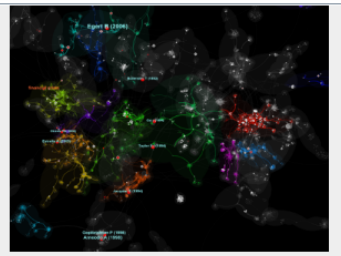
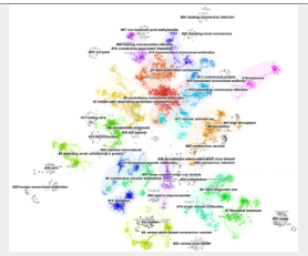
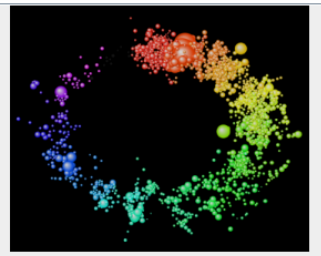
CiteSpace 6.4.R1 (64-bit) Advanced	Windows 11 (null/null)	Java 22.0.2+11 (64-bit)
Built: August 20, 2024	Processors: 12	Substrate VM
Expire: December 31, 2025	Host: 4CE301FFZV 59.77.41.150	Java Home: null

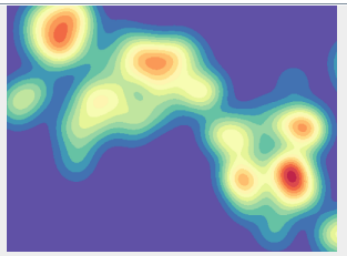
Key Publications

1. Chen, C. (2020) A Glimpse of the First Eight Months of the COVID-19 Literature on Microsoft Academic Graph. Front. Res. Metr. Anal. 5:607286.
2. Chen, C., Song, M. (2019) Visualizing a field of research: A methodology of systematic scientometric reviews. PLoS ONE, 14(10):e0223994.
3. Chen, C. (2017) Science mapping: A systematic review of the literature. JDIS, 2(2), 1-40.
4. Chen, C. (2016) CiteSpace: A Practical Guide for Mapping Scientific Literature. Nova Science Publishers.
5. Chen, C. et al. (2010) The structure and dynamics of co-citation clusters: A multiple-perspective co-citation analysis. JASIST, 61(7), 1386-1409.
6. Chen, C. (2006) CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature. JASIST, 57(3), 359-377.
7. Chen, C. (2004) Searching for intellectual turning points: Progressive Knowledge Domain Visualization. Proc. Nat. Acad. Sci., 101(Suppl.), 5303-5310.
8. **Chen, C. (2010) System and method for automatically generating systematic reviews of a scientific field. US Patent US20110295903A1.**

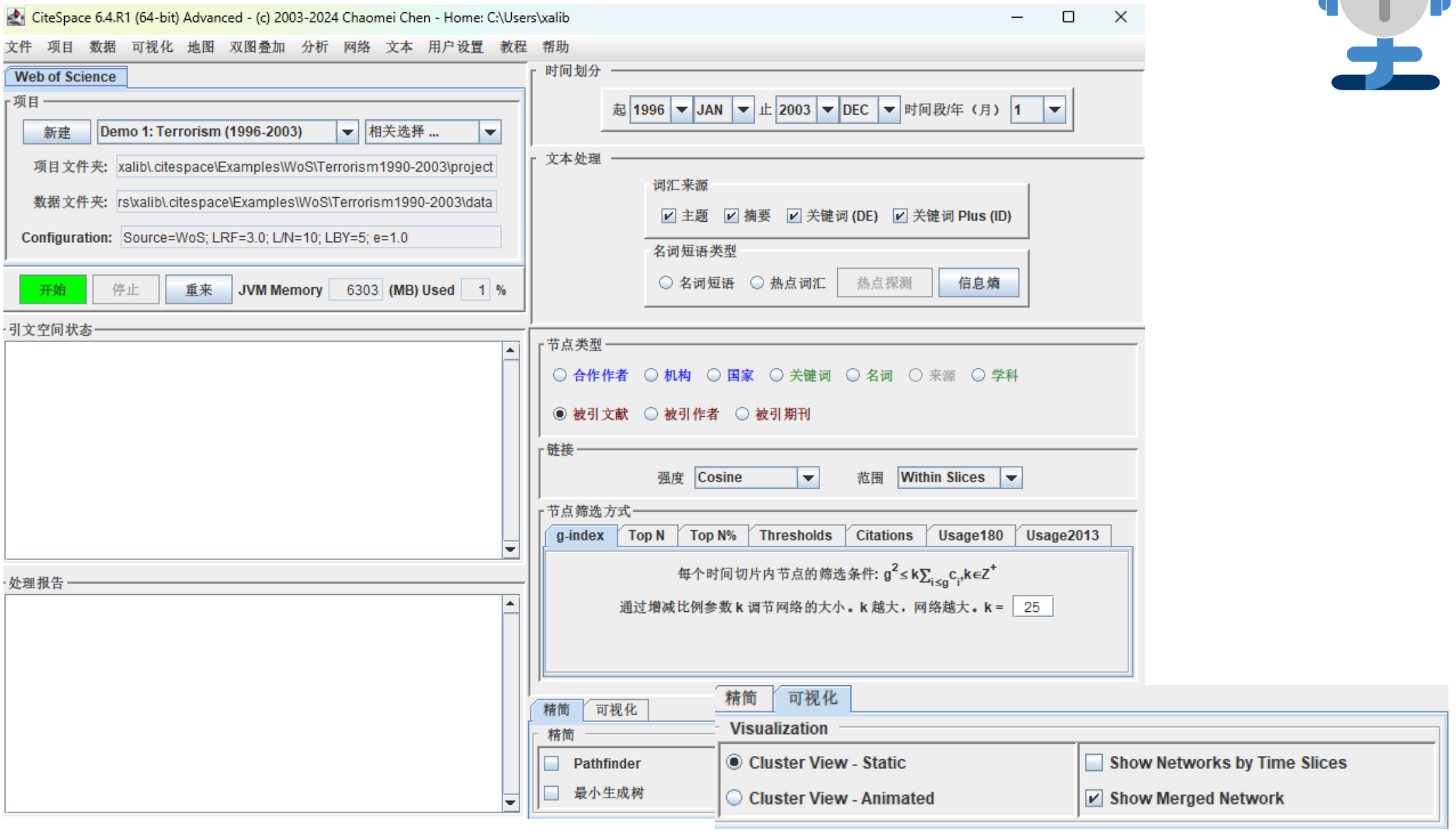
Acknowledgements

National Science Foundation (NSF): SMA-1633286, IIS-0612129, NSFDACS-10P1303; NEVAC; Thomson Reuters Citation Analysis Research Grant (2002)
Elsevier; Higher Education Press; IMS Health; Pfizer; Microsoft Azure Sponsorship

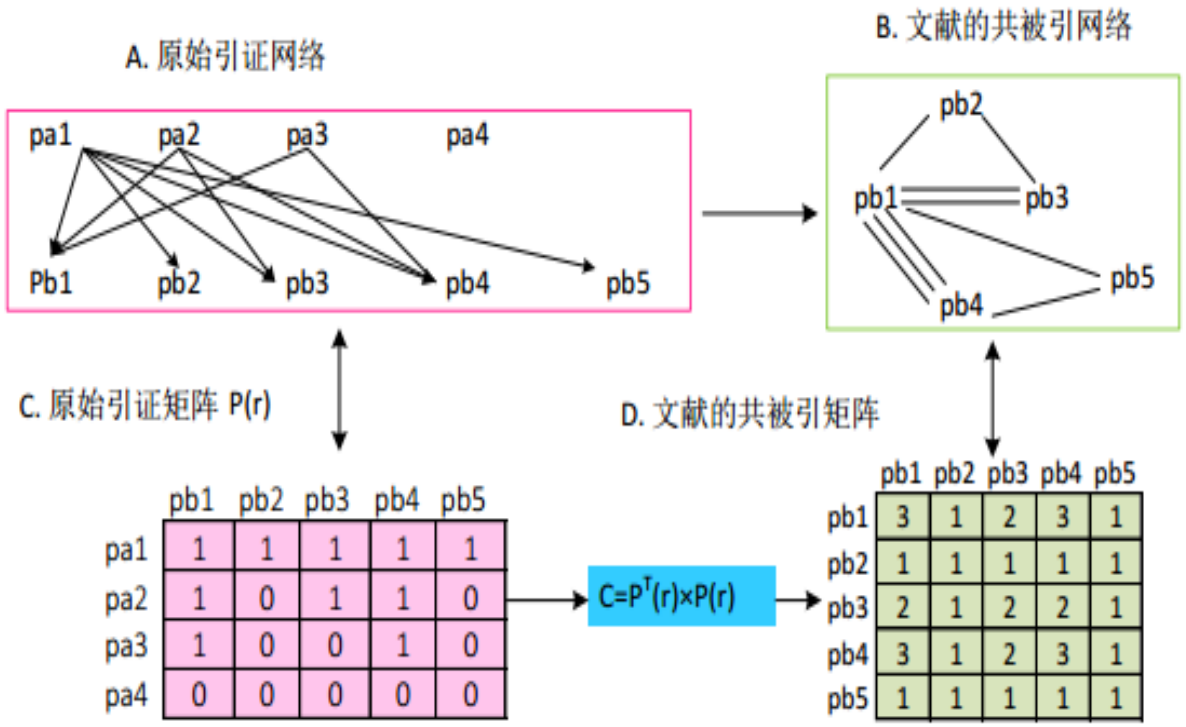







This version of CiteSpace is for personal use only. Use it at your own risk. Agree Disagree


CiteSpace 6.4.R1 (64-bit) Advanced - (c) 2003-2024 Chaomei Chen - Home: C:\Users\xalib
文件 项目 数据 可视化 地图 双图叠加 分析 网络 文本 用户设置 教程 帮助
Web of Science
项目
新建
Demo 1: Terrorism (1996-2003)
相关选择 ...
项目文件夹: xalib\.citespace\Examples\WoS\Terrorism1990-2003\project
数据文件夹: rs\xalib\.citespace\Examples\WoS\Terrorism1990-2003\data
Configuration: Source=WoS; LRF=3.0; L/N=10; LBY=5; e=1.0
开始
停止
重来
JVM Memory 6303 (MB) Used 1 %
引文空间状态
处理报告
时间划分
起 1996 JAN 止 2003 DEC 时间段/年（月） 1
文本处理
词汇来源
主题 摘要 关键词 (DE) 关键词 Plus (ID)
名词短语类型
名词短语 热点词汇 热点探测 信息熵
节点类型
合作作者 机构 国家 关键词 名词 来源 学科
被引文献 被引作者 被引期刊
链接
强度 Cosine 范围 Within Slices
节点筛选方式
g-index Top N Top N% Thresholds Citations Usage180 Usage2013
每个时间切片内节点的筛选条件: $g^2 \le k\sum_{i \le g} c_i, k \in Z^+$
通过增减比例参数 k 调节网络的大小。k 越大，网络越大。k = 25
精简 可视化
精简
Pathfinder
最小生成树
精简 可视化
Visualization
Cluster View - Static
Cluster View - Animated
Show Networks by Time Slices
Show Merged Network

06 文献共被引分析

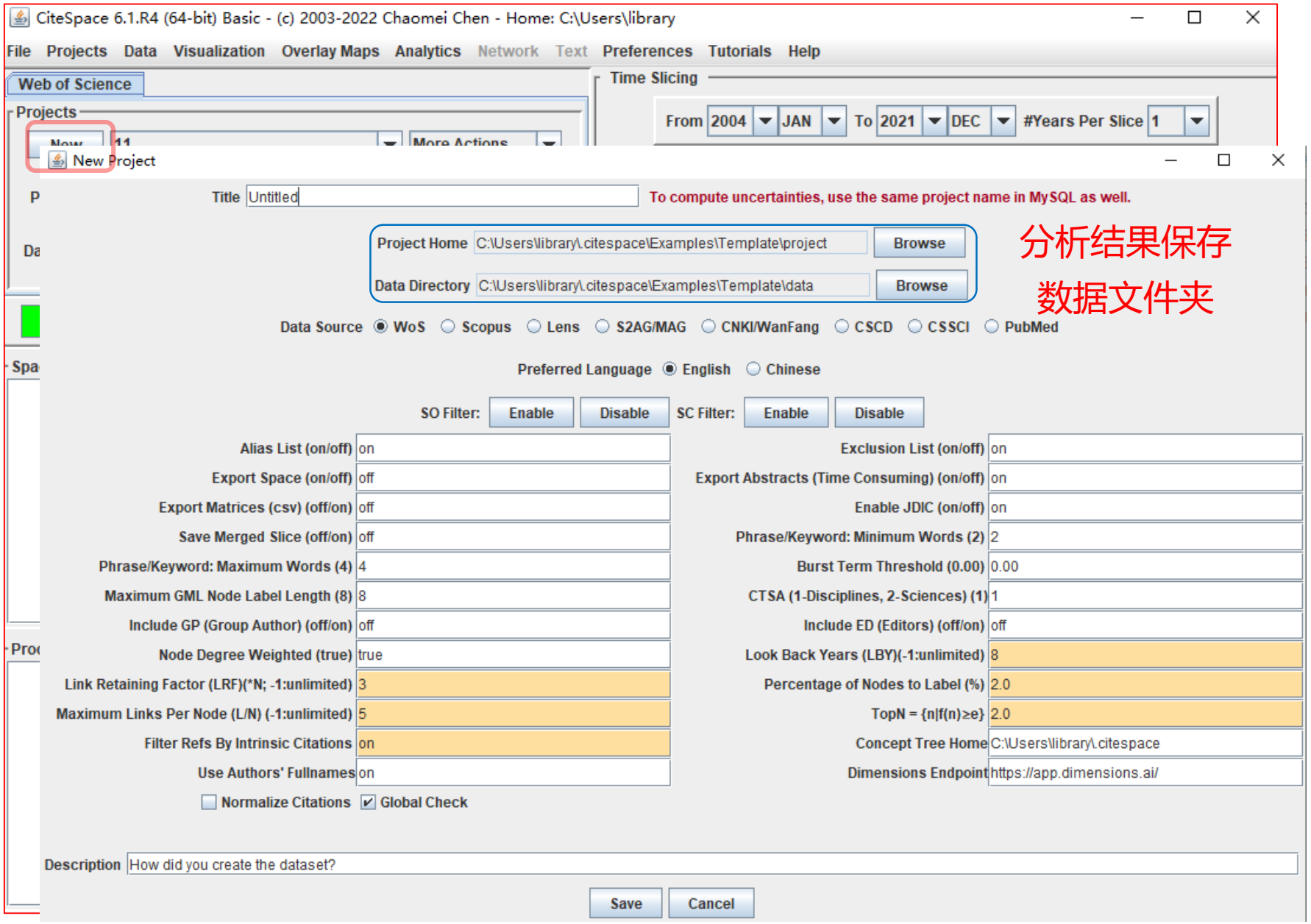


文献共被引分析

van Raan A F J. Advances in bibliometric analysis: Research performance assessment and science mapping[J]. Bibliometrics. Use and Abuse in the Review of Research Performance, 2014: 17-28.

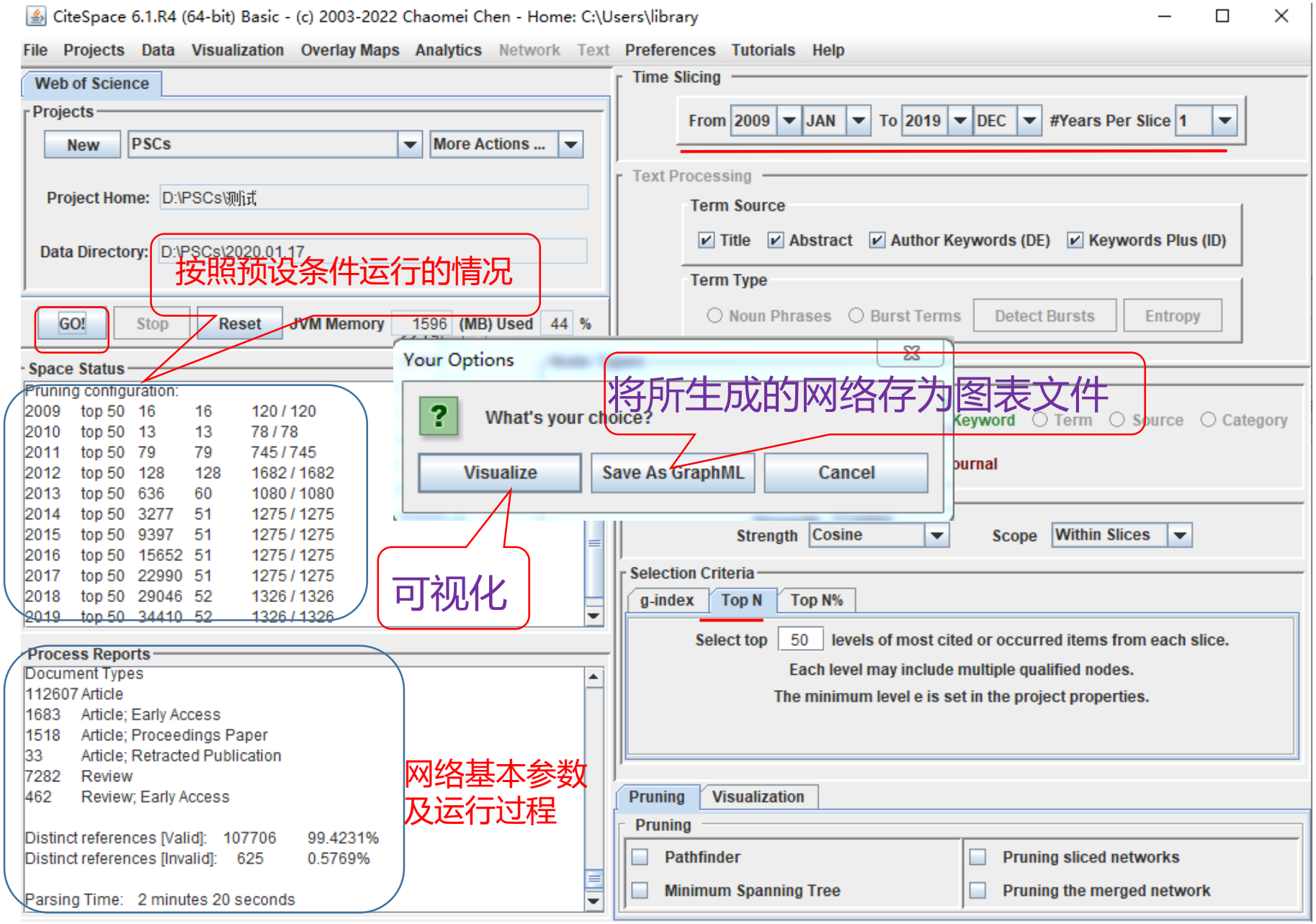
06

文献共被引分析


CiteSpace 6.1.R4 (64-bit) Basic - (c) 2003-2022 Chaomei Chen - Home: C:\Users\library
File Projects Data Visualization Overlay Maps Analytics Network Text Preferences Tutorials Help
Web of Science
Projects
Time Slicing
From 2004 JAN To 2021 DEC #Years Per Slice 1
New Project
Title Untitled
To compute uncertainties, use the same project name in MySQL as well.
Project Home C:\Users\library\.citespace\Examples\Template\project Browse
Data Directory C:\Users\library\.citespace\Examples\Template\data Browse
分析结果保存
数据文件夹
Data Source WoS Scopus Lens S2AG/MAG CNKI/WanFang CSCD CSSCI PubMed
Preferred Language English Chinese
SO Filter: Enable Disable SC Filter: Enable Disable
Alias List (on/off) on
Export Space (on/off) off
Export Matrices (csv) (off/on) off
Save Merged Slice (off/on) off
Phrase/Keyword: Maximum Words (4) 4
Maximum GML Node Label Length (8) 8
Include GP (Group Author) (off/on) off
Node Degree Weighted (true) true
Link Retaining Factor (LRF)(*N; -1:unlimited) 3
Maximum Links Per Node (L/N) (-1:unlimited) 5
Filter Refs By Intrinsic Citations on
Use Authors' Fullnames on
Exclusion List (on/off) on
Export Abstracts (Time Consuming) (on/off) on
Enable JDIC (on/off) on
Phrase/Keyword: Minimum Words (2) 2
Burst Term Threshold (0.00) 0.00
CTSA (1-Disciplines, 2-Sciences) (1) 1
Include ED (Editors) (off/on) off
Look Back Years (LBY)(-1:unlimited) 8
Percentage of Nodes to Label (%) 2.0
TopN = {n|f(n)≥e} 2.0
Concept Tree Home C:\Users\library\.citespace
Dimensions Endpoint https://app.dimensions.ai/
Normalize Citations Global Check
Description How did you create the dataset?
Save Cancel

06

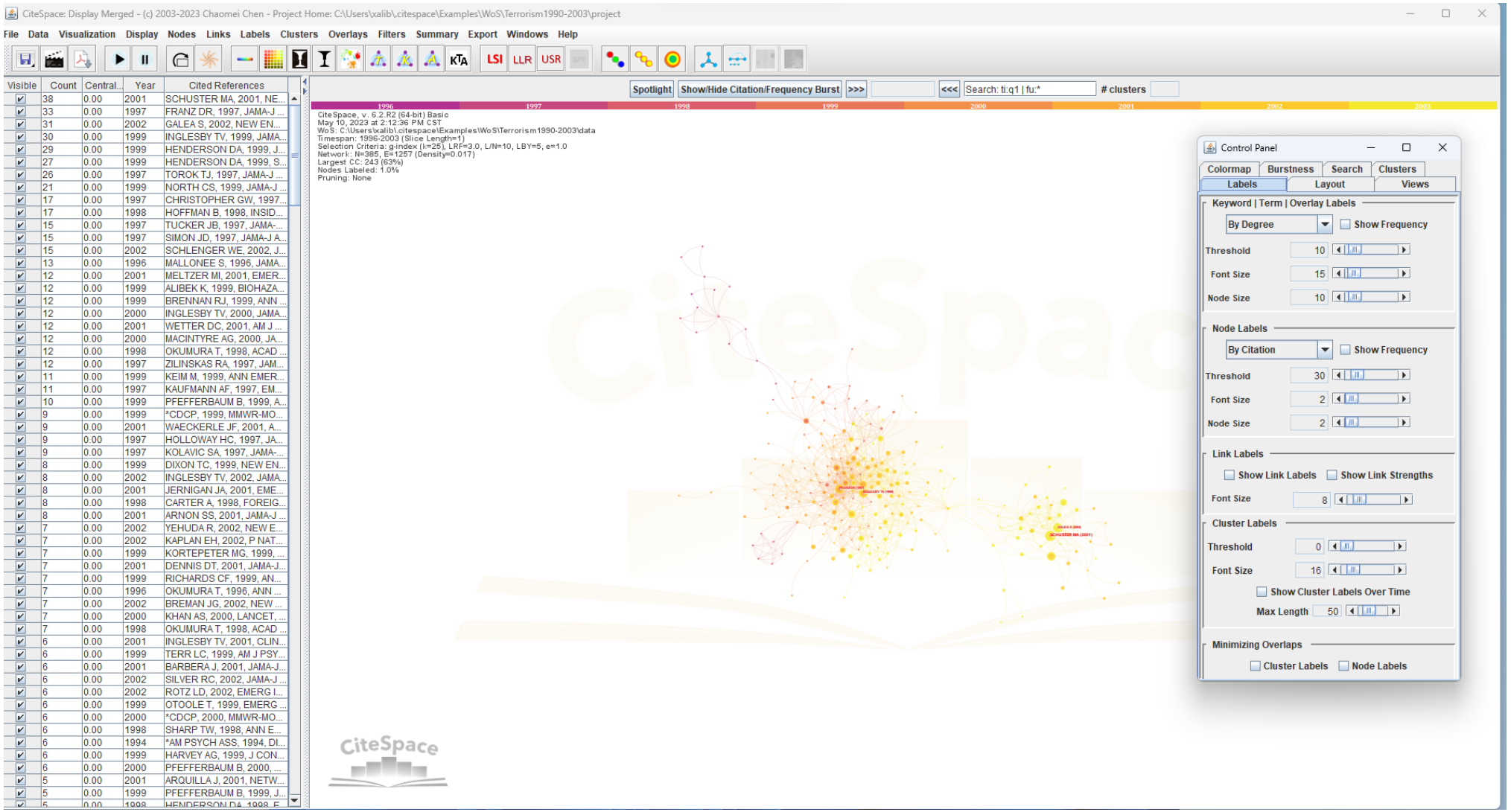
文献共被引分析


CiteSpace 6.1.R4 (64-bit) Basic - (c) 2003-2022 Chaomei Chen - Home: C:\Users\library
File Projects Data Visualization Overlay Maps Analytics Network Text Preferences Tutorials Help
Web of Science
Projects
New
PSCs
More Actions ...
Project Home: D:\PSCs\测试
Data Directory: D:\PSCs\2020.01.17
按照预设条件运行的情况
GO!
Stop
Reset
JVM Memory 1596 (MB) Used 44 %
Time Slicing
From 2009 JAN To 2019 DEC #Years Per Slice 1
Text Processing
Term Source
Title Abstract Author Keywords (DE) Keywords Plus (ID)
Term Type
Noun Phrases Burst Terms Detect Bursts Entropy
Your Options
What's your choice?
Visualize
Save As GraphML
Cancel
将所生成的网络存为图表文件
可视化
Space Status
Pruning configuration:
2009 top 50 16 16 120 / 120
2010 top 50 13 13 78 / 78
2011 top 50 79 79 745 / 745
2012 top 50 128 128 1682 / 1682
2013 top 50 636 60 1080 / 1080
2014 top 50 3277 51 1275 / 1275
2015 top 50 9397 51 1275 / 1275
2016 top 50 15652 51 1275 / 1275
2017 top 50 22990 51 1275 / 1275
2018 top 50 29046 52 1326 / 1326
2019 top 50 34410 52 1326 / 1326
Strength Cosine
Scope Within Slices
Selection Criteria
g-index Top N Top N%
Select top 50 levels of most cited or occurred items from each slice.
Each level may include multiple qualified nodes.
The minimum level e is set in the project properties.
Process Reports
Document Types
112607 Article
1683 Article; Early Access
1518 Article; Proceedings Paper
33 Article; Retracted Publication
7282 Review
462 Review; Early Access
Distinct references [Valid]: 107706 99.4231%
Distinct references [Invalid]: 625 0.5769%
Parsing Time: 2 minutes 20 seconds
网络基本参数及运行过程
Pruning Visualization
Pruning
Pathfinder
Minimum Spanning Tree
Pruning sliced networks
Pruning the merged network

06

文献共被引分析

可视化结果



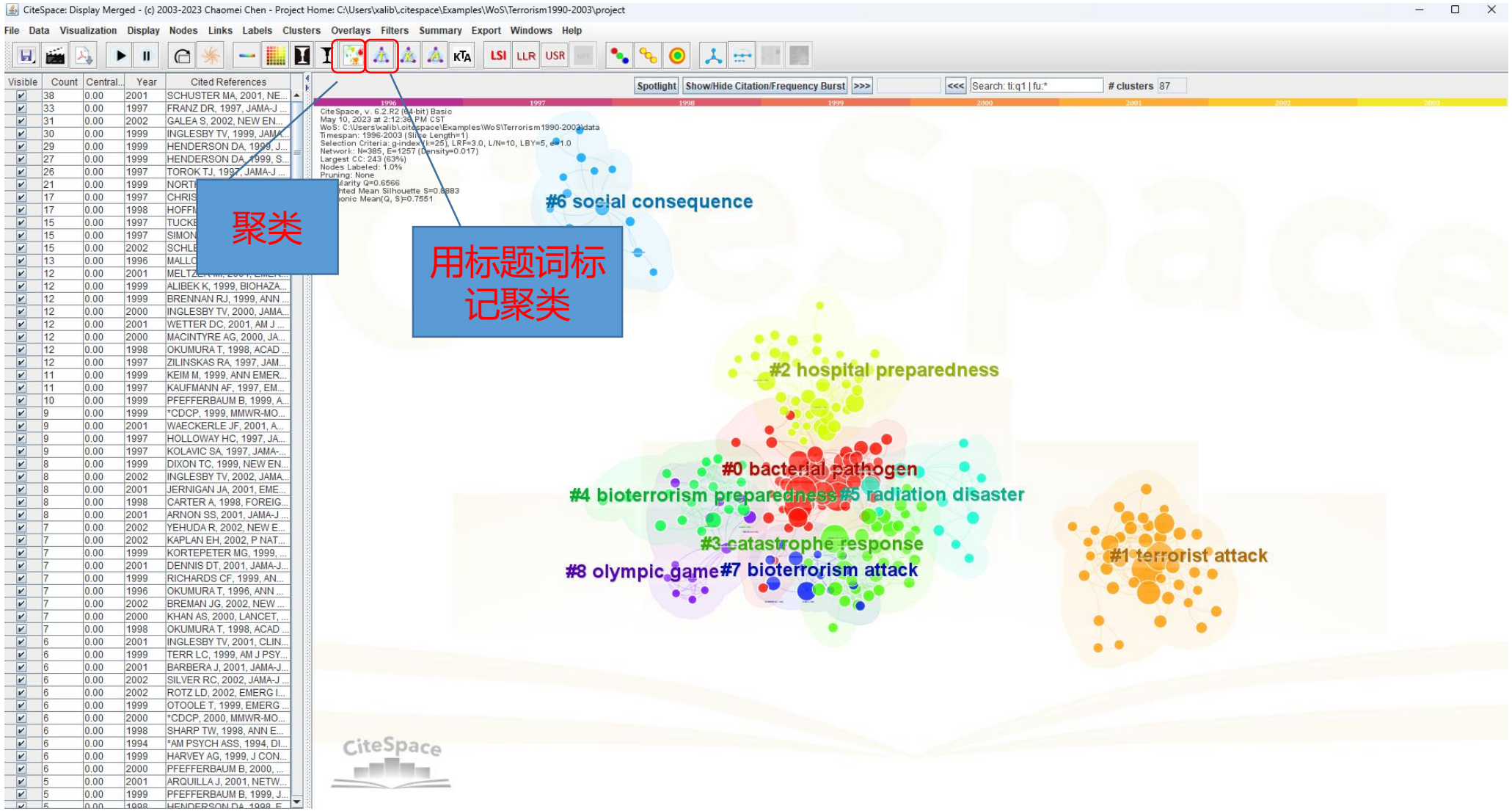
Visible	Count	Central...	Year	Cited References
☑	38	0.00	2001	SCHUSTER MA, 2001, NE...
☑	33	0.00	1997	FRANZ DR, 1997, JAMA-J ...
☑	31	0.00	2002	GALEA S, 2002, NEW EN...
☑	30	0.00	1999	INGLESBY TV, 1999, JAMA...
☑	29	0.00	1999	HENDERSON DA, 1999, J...
☑	27	0.00	1999	HENDERSON DA, 1999, S...
☑	26	0.00	1997	TOROK TJ, 1997, JAMA-J ...
☑	21	0.00	1999	NORTH CS, 1999, JAMA-J ...
☑	17	0.00	1997	CHRISTOPHER GW, 1997...
☑	17	0.00	1998	HOFFMAN B, 1998, INSID...
☑	15	0.00	1997	TUCKER JB, 1997, JAMA-...
☑	15	0.00	1997	SIMON JD, 1997, JAMA-J A...
☑	15	0.00	2002	SCHLENGER WE, 2002, J...
☑	13	0.00	1996	MALLONEE S, 1996, JAMA...
☑	12	0.00	2001	MELTZER MI, 2001, EMER...
☑	12	0.00	1999	ALIBEK K, 1999, BIOHAZA...
☑	12	0.00	1999	BRENNAN RJ, 1999, ANN ...
☑	12	0.00	2000	INGLESBY TV, 2000, JAMA...
☑	12	0.00	2001	WETTER DC, 2001, AM J ...
☑	12	0.00	2000	MACINTYRE AG, 2000, JA...
☑	12	0.00	1998	OKUMURA T, 1998, ACAD ...
☑	12	0.00	1997	ZILINSKAS RA, 1997, JAM...
☑	11	0.00	1999	KEIM M, 1999, ANN EMER...
☑	11	0.00	1997	KAUFMANN AF, 1997, EM...
☑	10	0.00	1999	PFEFFERBAUM B, 1999, A...
☑	9	0.00	1999	*CDCP, 1999, MMWR-MO...
☑	9	0.00	2001	WAECKERLE JF, 2001, A...
☑	9	0.00	1997	HOLLOWAY HC, 1997, JA...
☑	9	0.00	1997	KOLAVIC SA, 1997, JAMA-...
☑	8	0.00	1999	DIXON TC, 1999, NEW EN...
☑	8	0.00	2002	INGLESBY TV, 2002, JAMA...
☑	8	0.00	2001	JERNIGAN JA, 2001, EME...
☑	8	0.00	1998	CARTER A, 1998, FOREIG...
☑	8	0.00	2001	ARNON SS, 2001, JAMA-J ...
☑	7	0.00	2002	YEHUDA R, 2002, NEW E...
☑	7	0.00	2002	KAPLAN EH, 2002, P NAT...
☑	7	0.00	1999	KORTEPETER MG, 1999, ...
☑	7	0.00	2001	DENNIS DT, 2001, JAMA-J...
☑	7	0.00	1999	RICHARDS CF, 1999, AN...
☑	7	0.00	1996	OKUMURA T, 1996, ANN ...
☑	7	0.00	2002	BREMAN JG, 2002, NEW ...
☑	7	0.00	2000	KHAN AS, 2000, LANCET, ...
☑	7	0.00	1998	OKUMURA T, 1998, ACAD ...
☑	6	0.00	2001	INGLESBY TV, 2001, CLIN...
☑	6	0.00	1999	TERR LC, 1999, AM J PSY...
☑	6	0.00	2001	BARBERA J, 2001, JAMA-J...
☑	6	0.00	2002	SILVER RC, 2002, JAMA-J ...
☑	6	0.00	2002	ROTZ LD, 2002, EMERG I...
☑	6	0.00	1999	OTOOLE T, 1999, EMERG ...
☑	6	0.00	2000	*CDCP, 2000, MMWR-MO...
☑	6	0.00	1998	SHARP TW, 1998, ANN E...
☑	6	0.00	1994	*AM PSYCH ASS, 1994, DI...
☑	6	0.00	1999	HARVEY AG, 1999, J CON...
☑	6	0.00	2000	PFEFFERBAUM B, 2000, ...
☑	5	0.00	2001	ARQUILLA J, 2001, NETW...
☑	5	0.00	1999	PFEFFERBAUM B, 1999, J...

当网络布局稳定

06

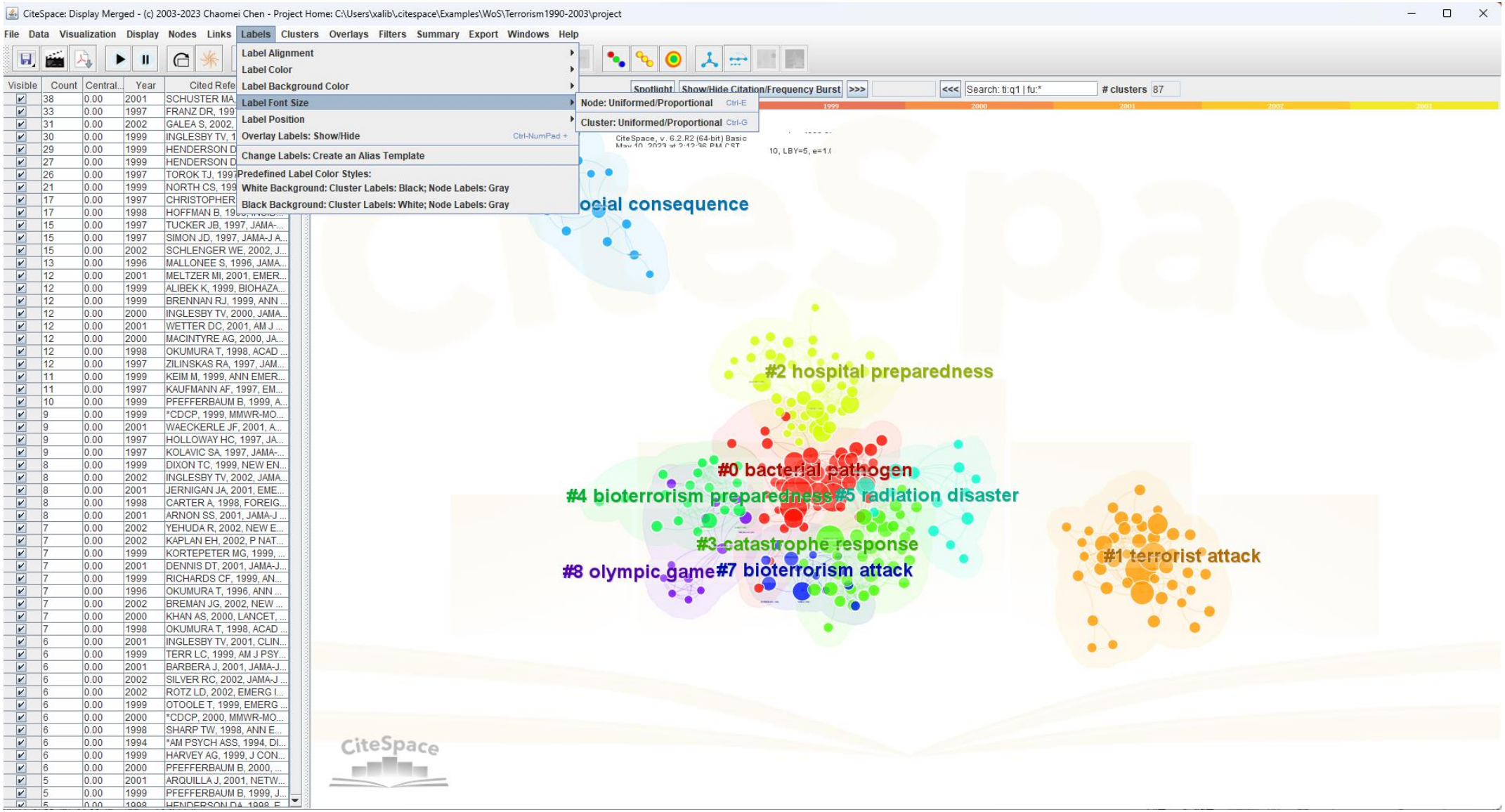
文献共被引分析

对共被引网络进行聚类



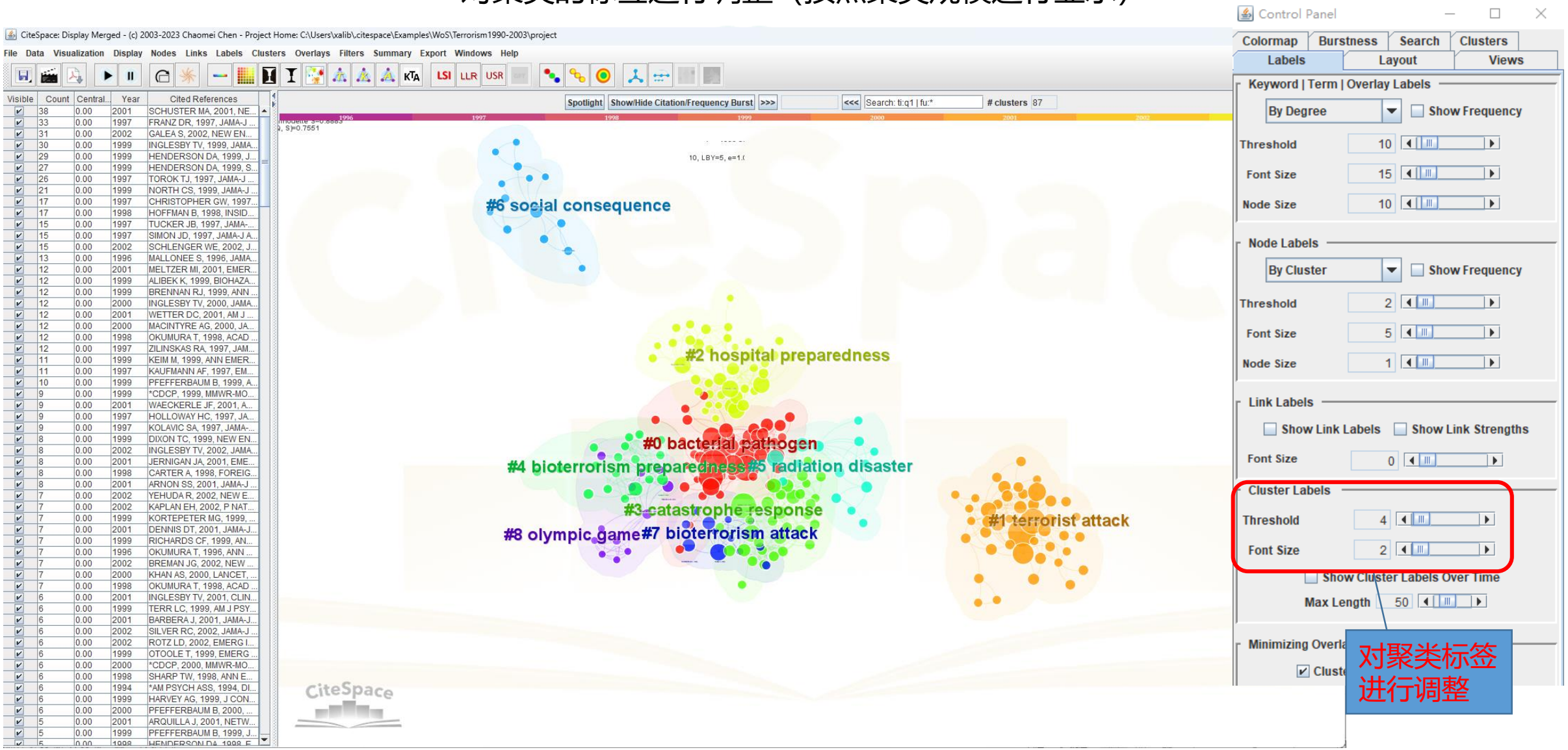
06 文献共被引分析

对聚类的标签进行调整（按照聚类规模进行显示）



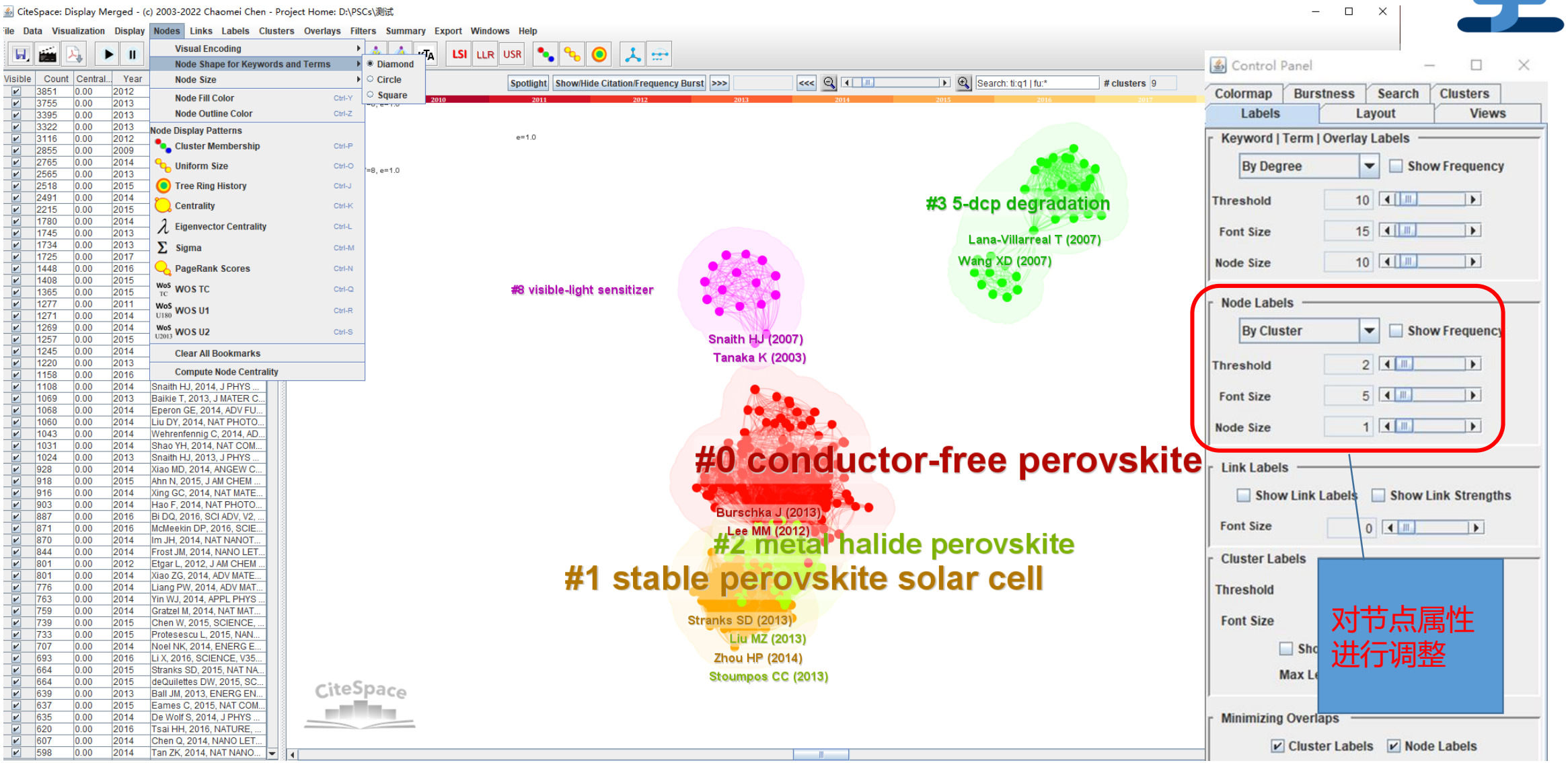
06 文献共被引分析

对聚类的标签进行调整（按照聚类规模进行显示）



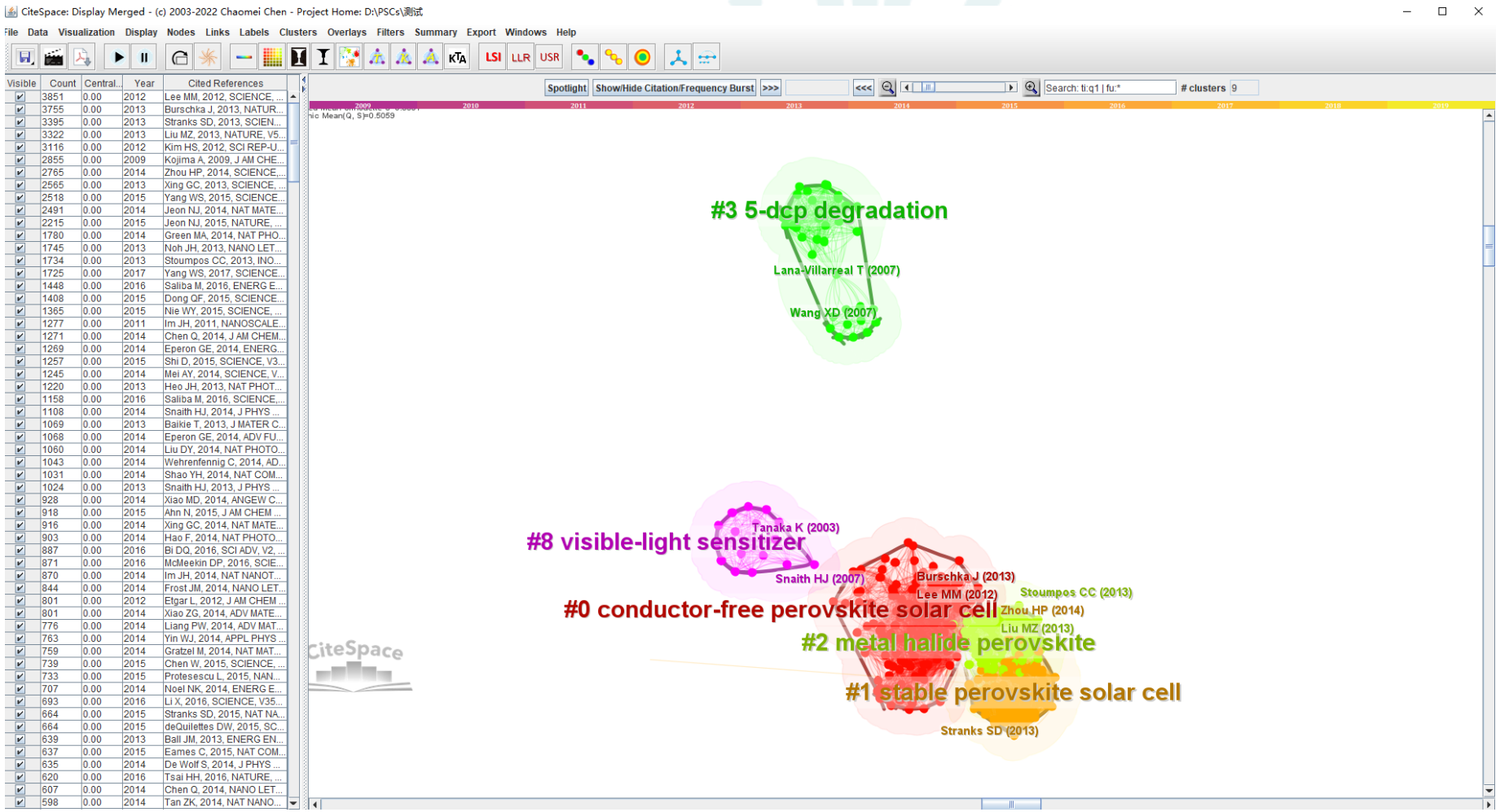
06 文献共被引分析

对节点属性进行调整



06 文献共被引分析

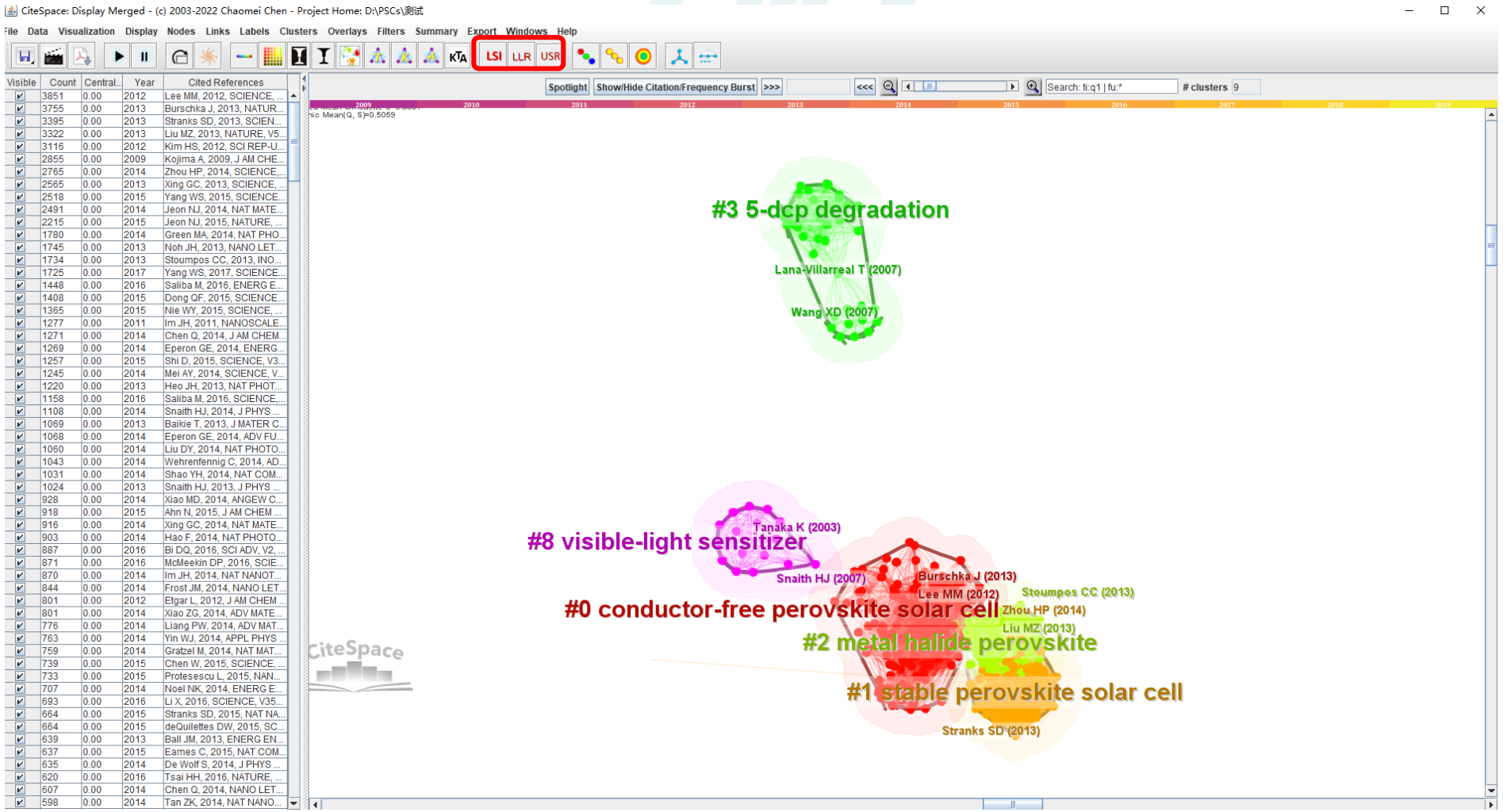
对聚类的轮廓显示进行调整



06

文献共被引分析

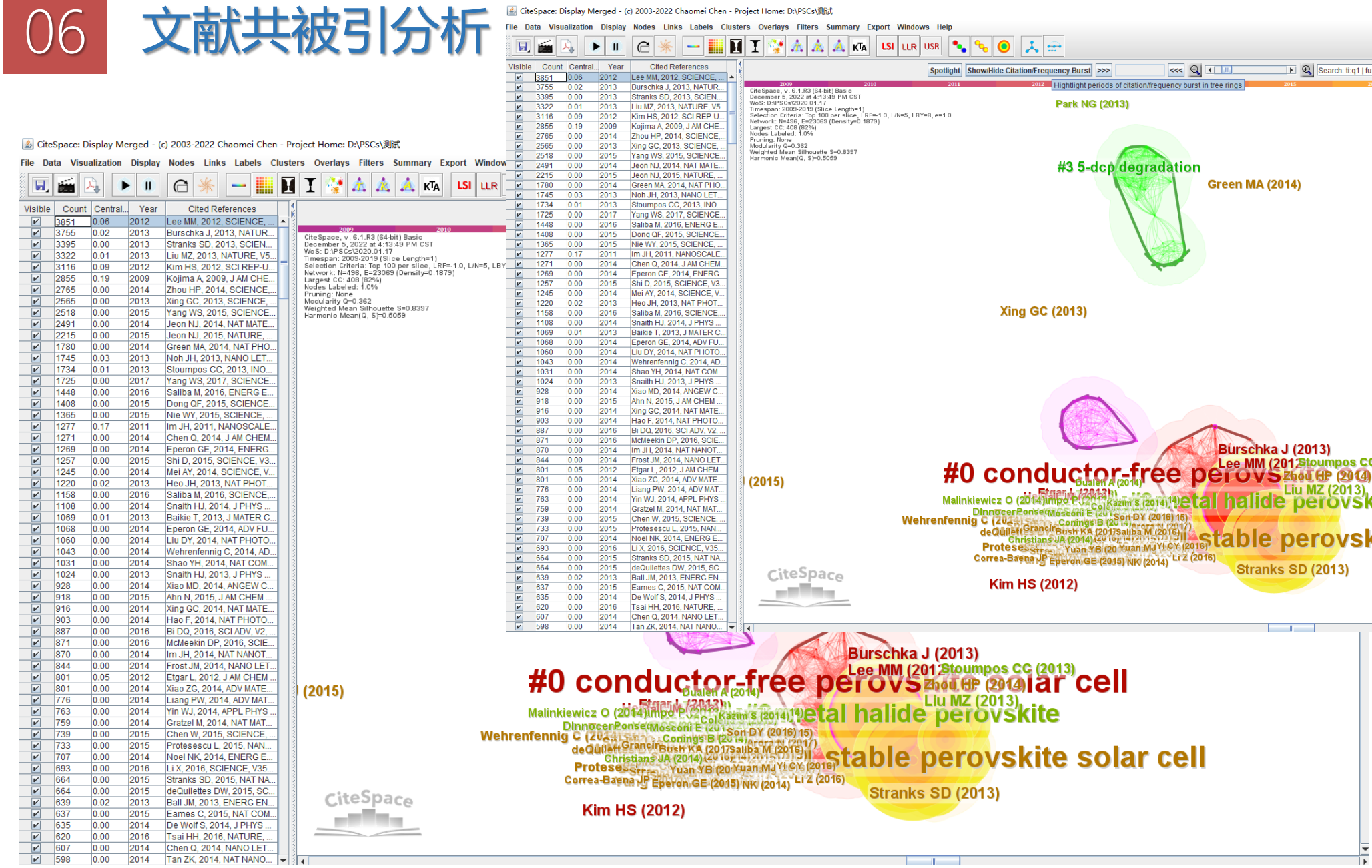
得到较为满意的图谱后，使用有三种不同的算法对聚类进行命名。通常情况下陈教授推荐使用LLR算法得到的结果。



LLR

06

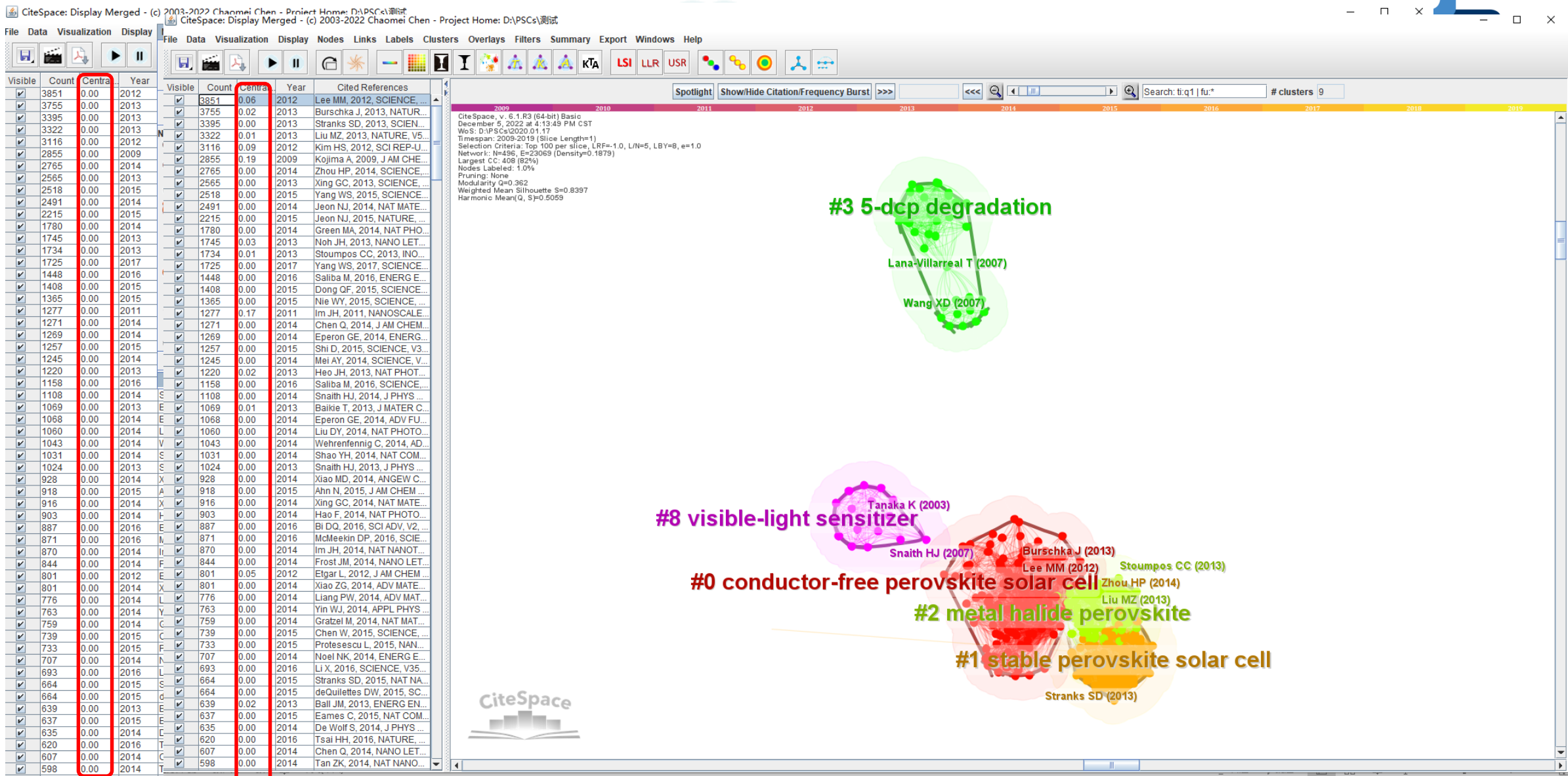
文献共被引分析



对文献被引的突变进行检测

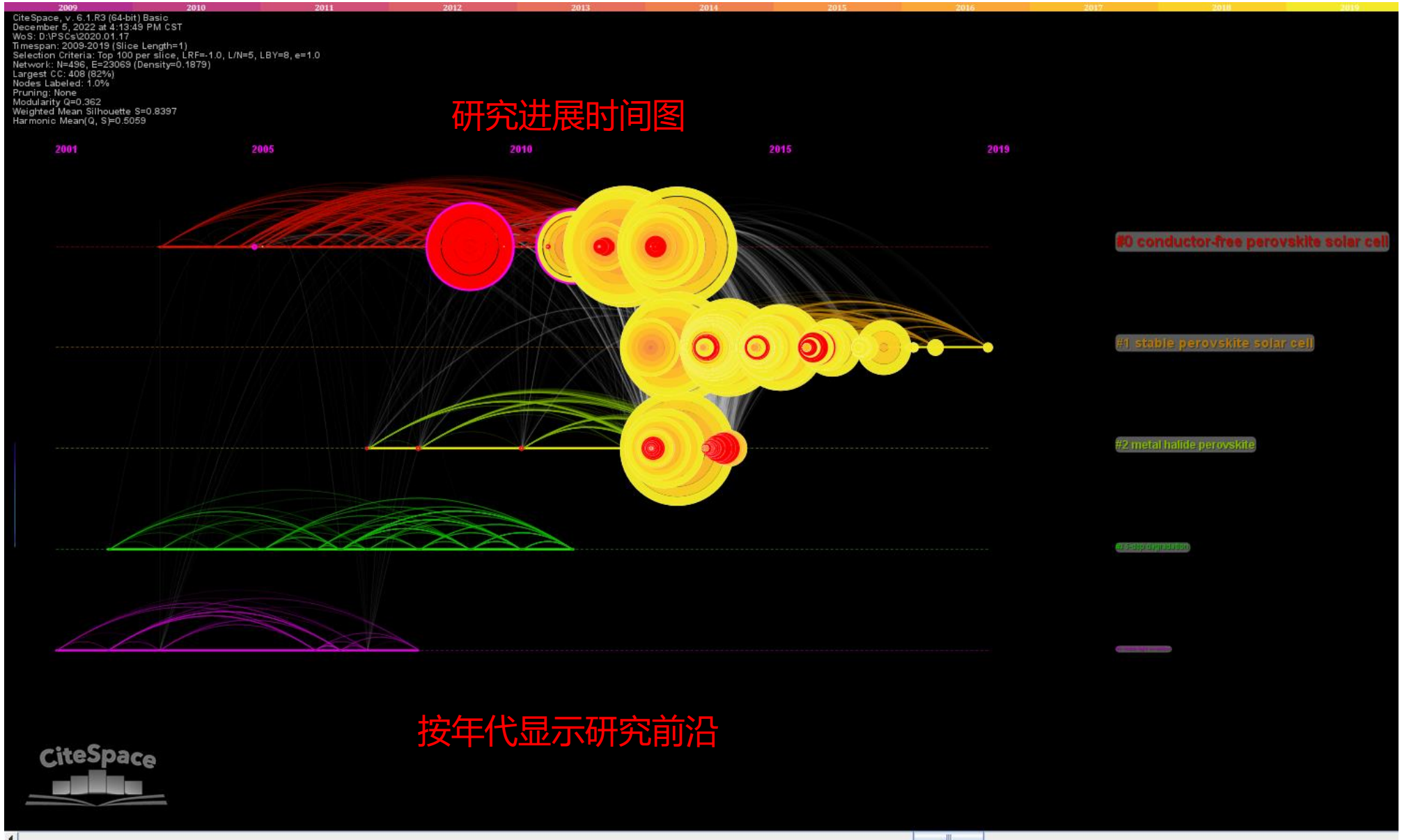
06 文献共被引分析

计算节点的中介中心性



06 文献共被引分析

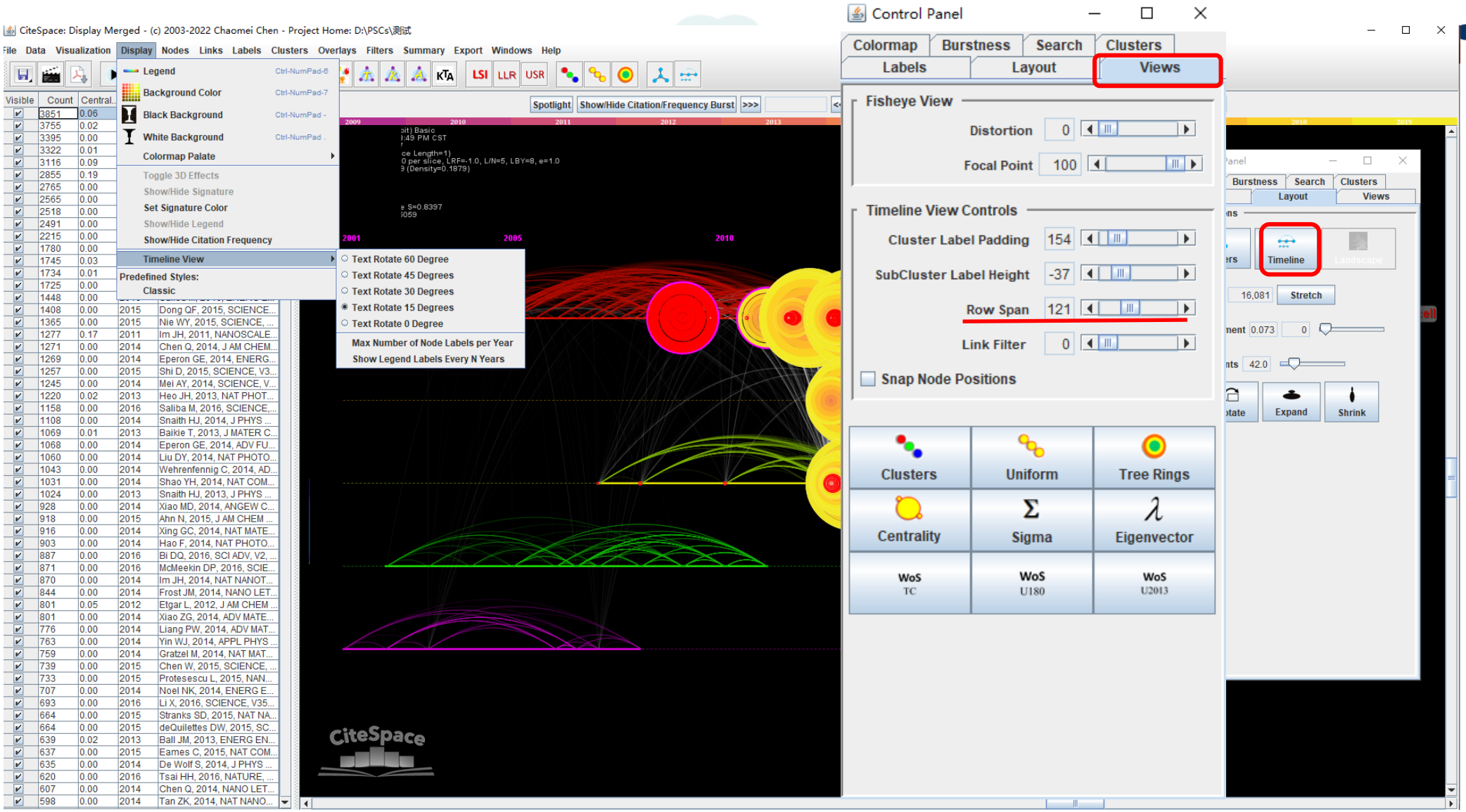
Timeline 呈现方式



06

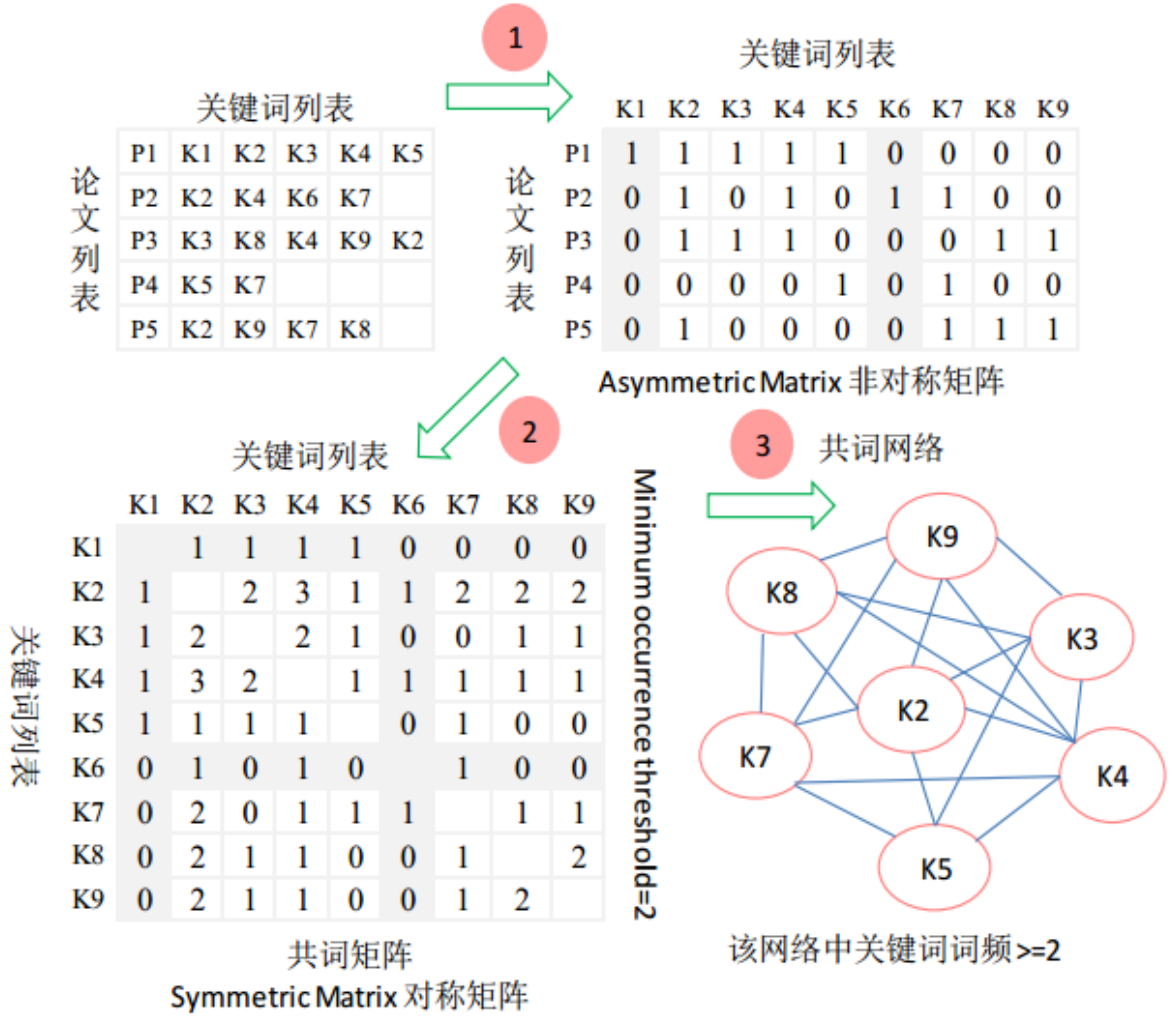
文献共被引分析

Timeline 呈现方式



07 主题共现分析——关键词和名词性术语共现分析

词频和共词分析



07 主题共现分析——关键词和名词性术语共现分析

Whittaker最早提出共词分析的假设前提（Whittaker，1989）

a)作者是很认真的选择技术术语；

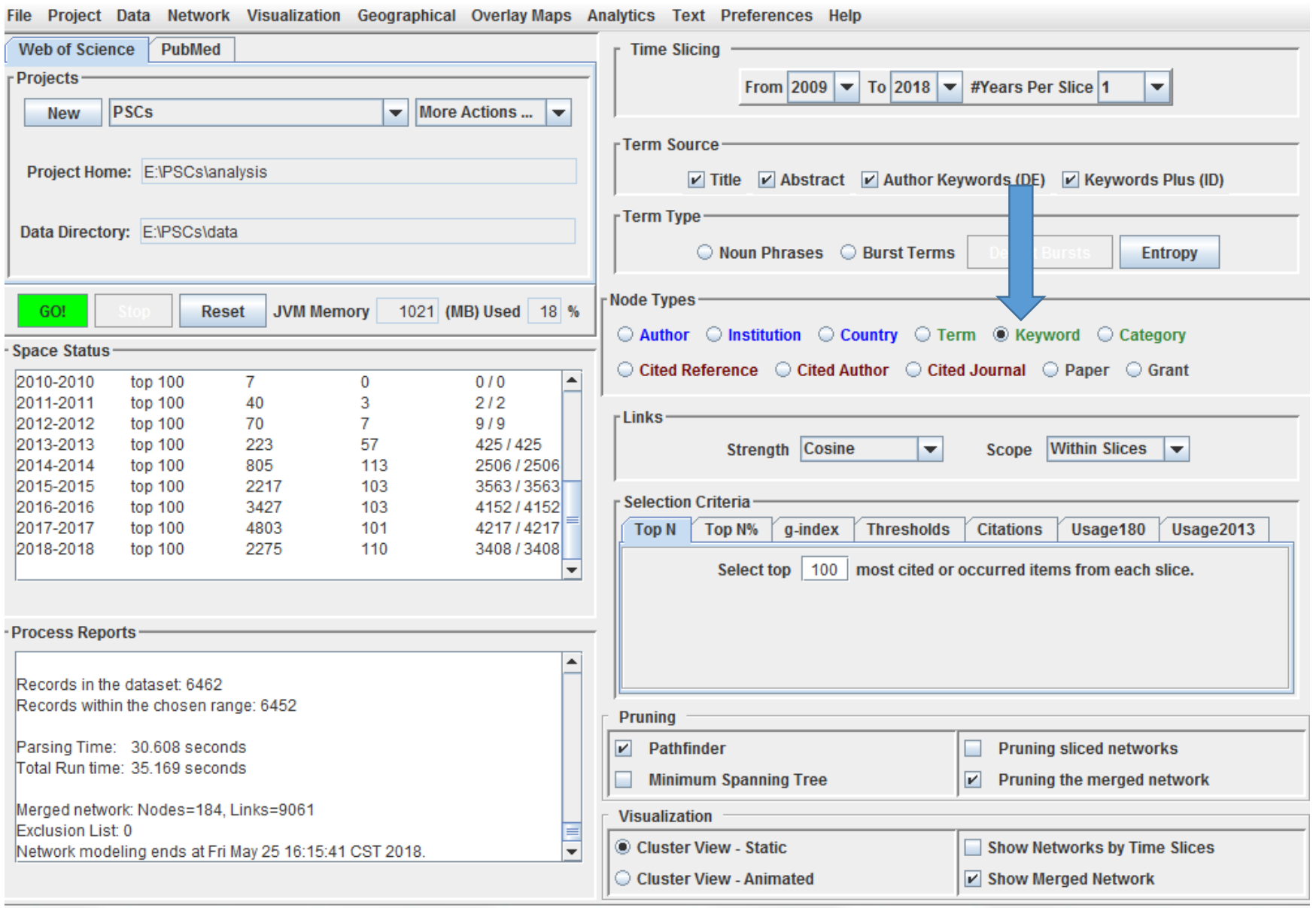
b)当在同一篇文章中使用不同的术语时，就意味着这些术语之间的关系并不是微不足道，且一定是被作者认可和认同；

c)如果有足够多的作者对同一种关系认可，那么这种关系可以认为在他们所关注的科学领域中具有一定意义；

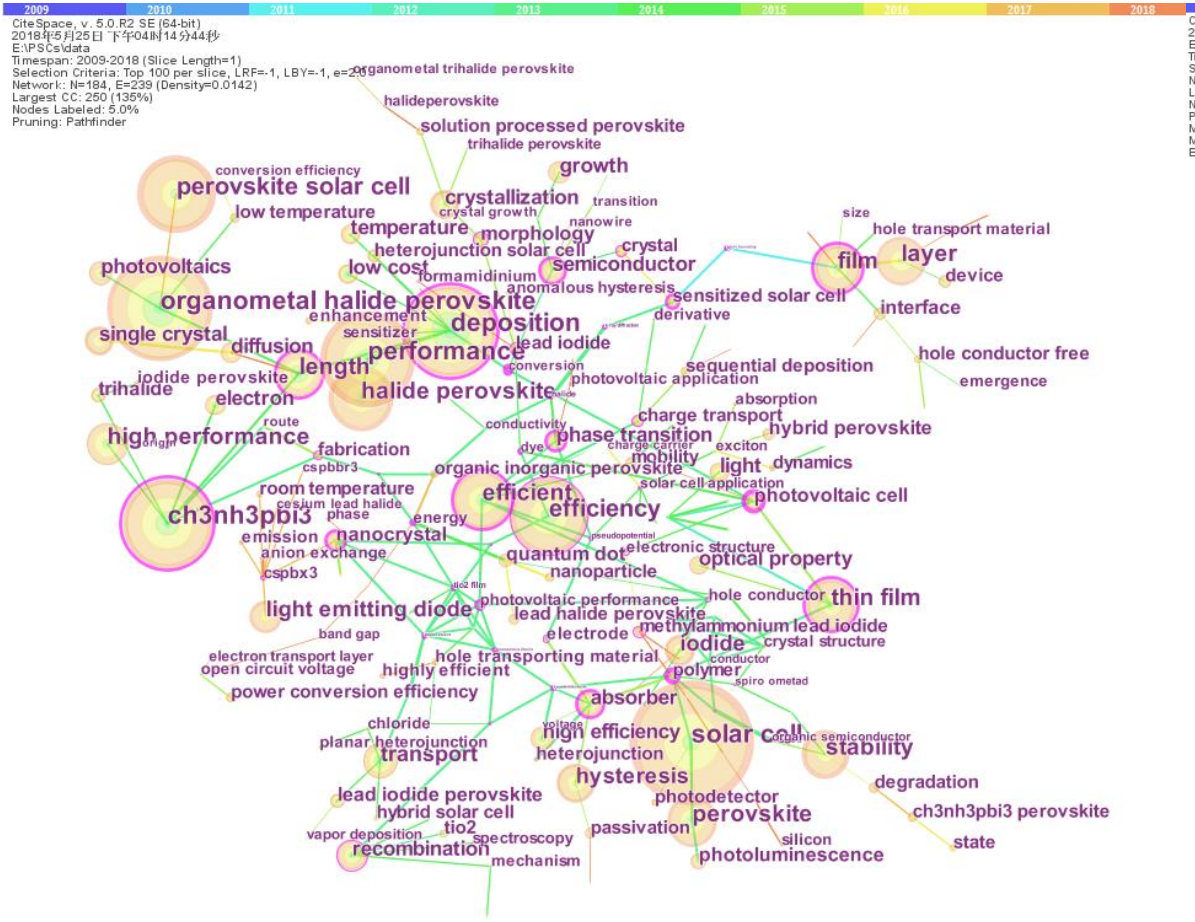
d)当针对关键词时，经过专业学习的学者，在其论文中标引出来的关键词是能够反映文章的内容的，是值得信赖的指标。在作者标引关键词时，通常也会受到其他学者成果的影响，而在论文中使用相同或者类似的关键词标引自己的论文。

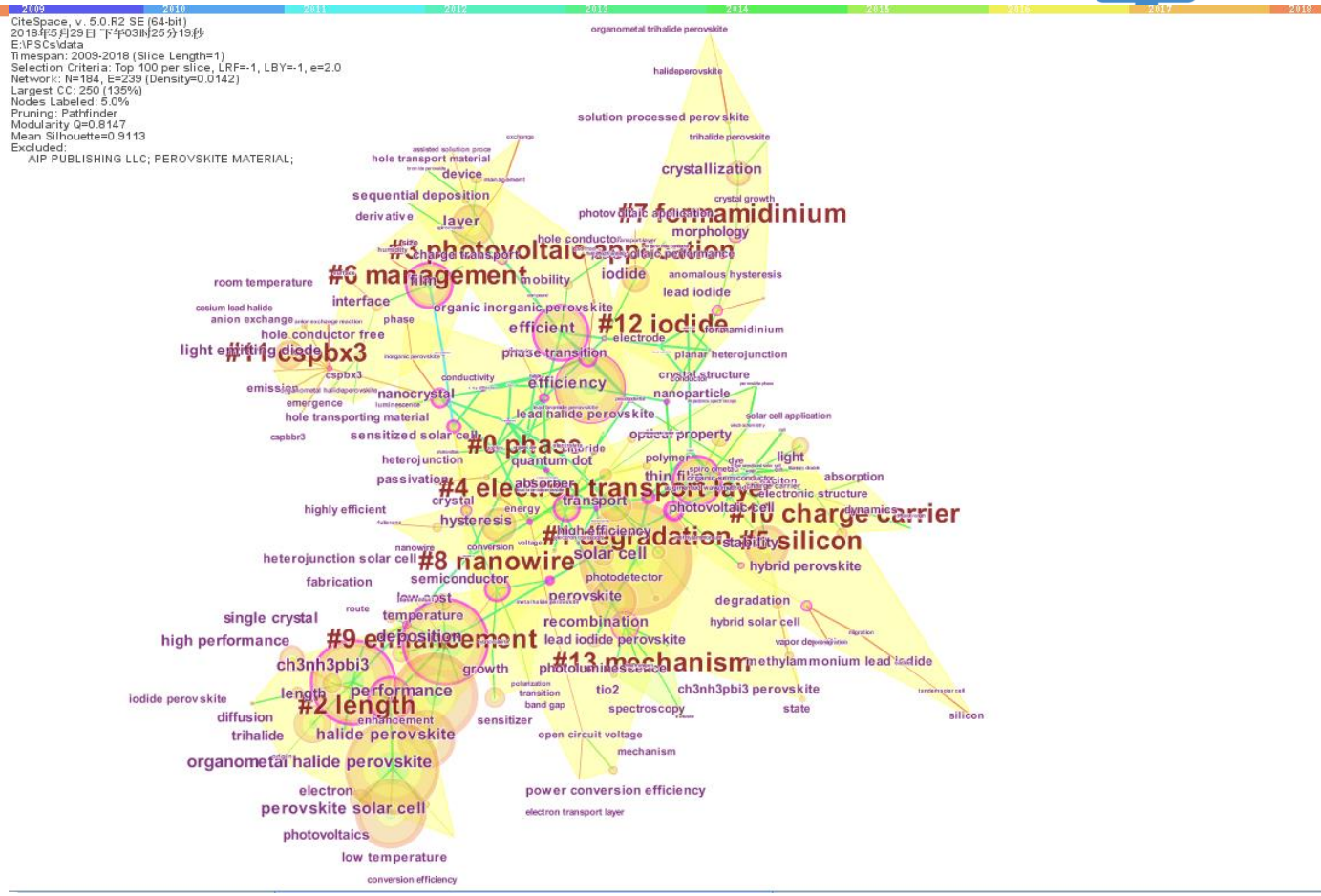
07

主题共现分析——关键词共现分析



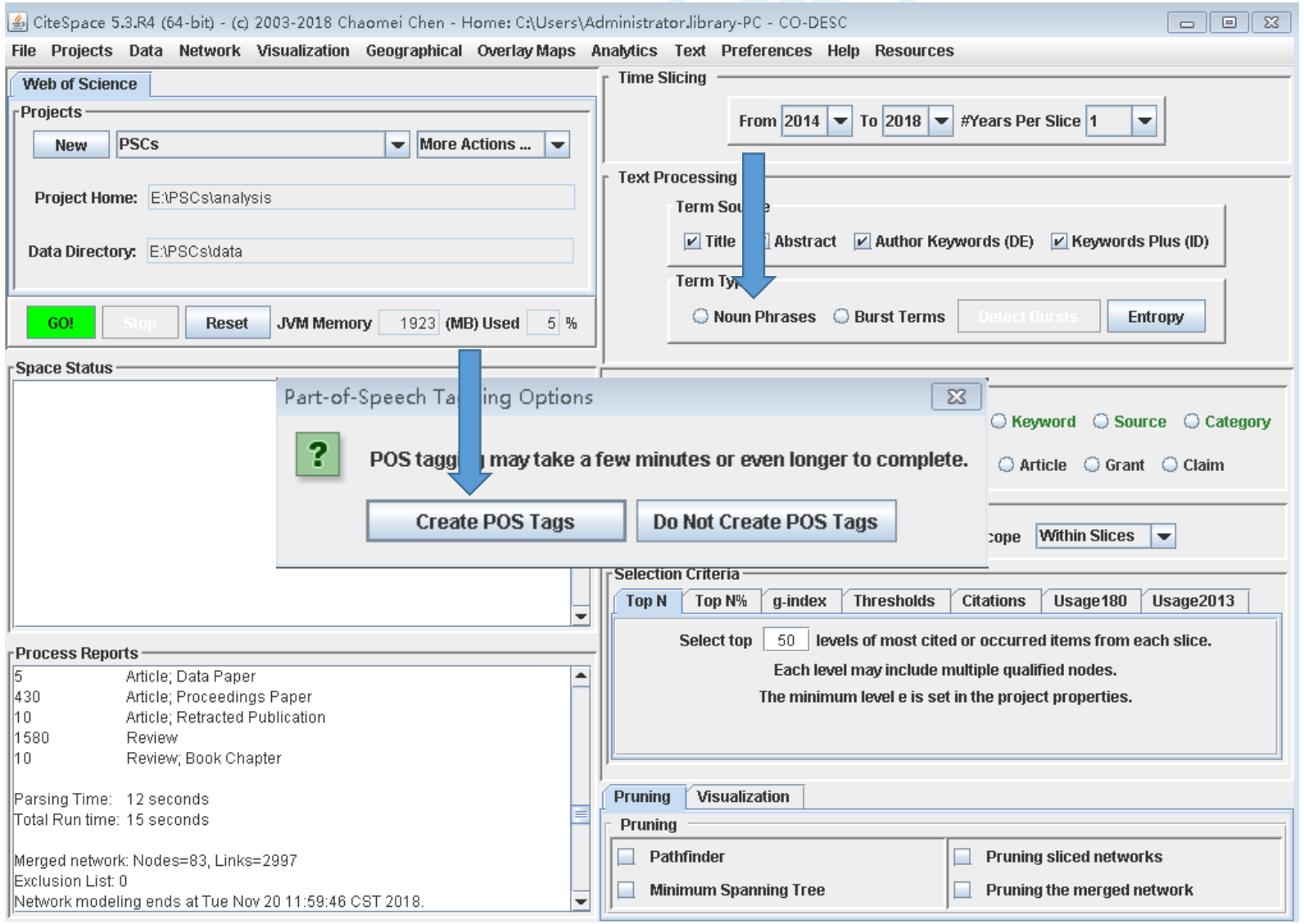
07 主题共现分析——关键词共现分析





07 主题共现分析——名词性术语共现分析

1. 点击Term type中的“Noun Phrases”。再点击“Create POS Tags”

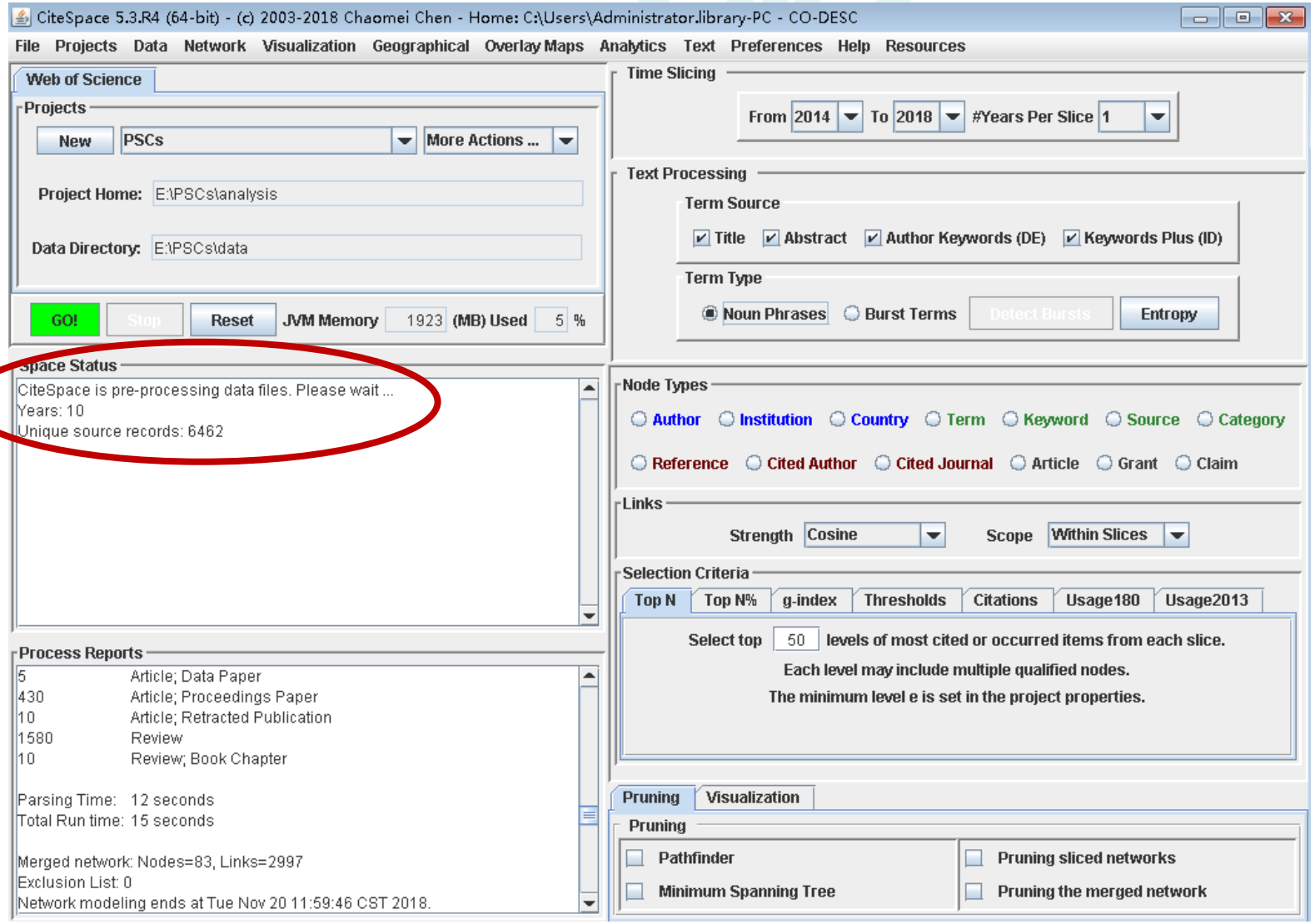


中文不能使用名词性术语提取功能，因为该功能是专门基于英文处理的

07

主题共现分析——名词性术语共现分析

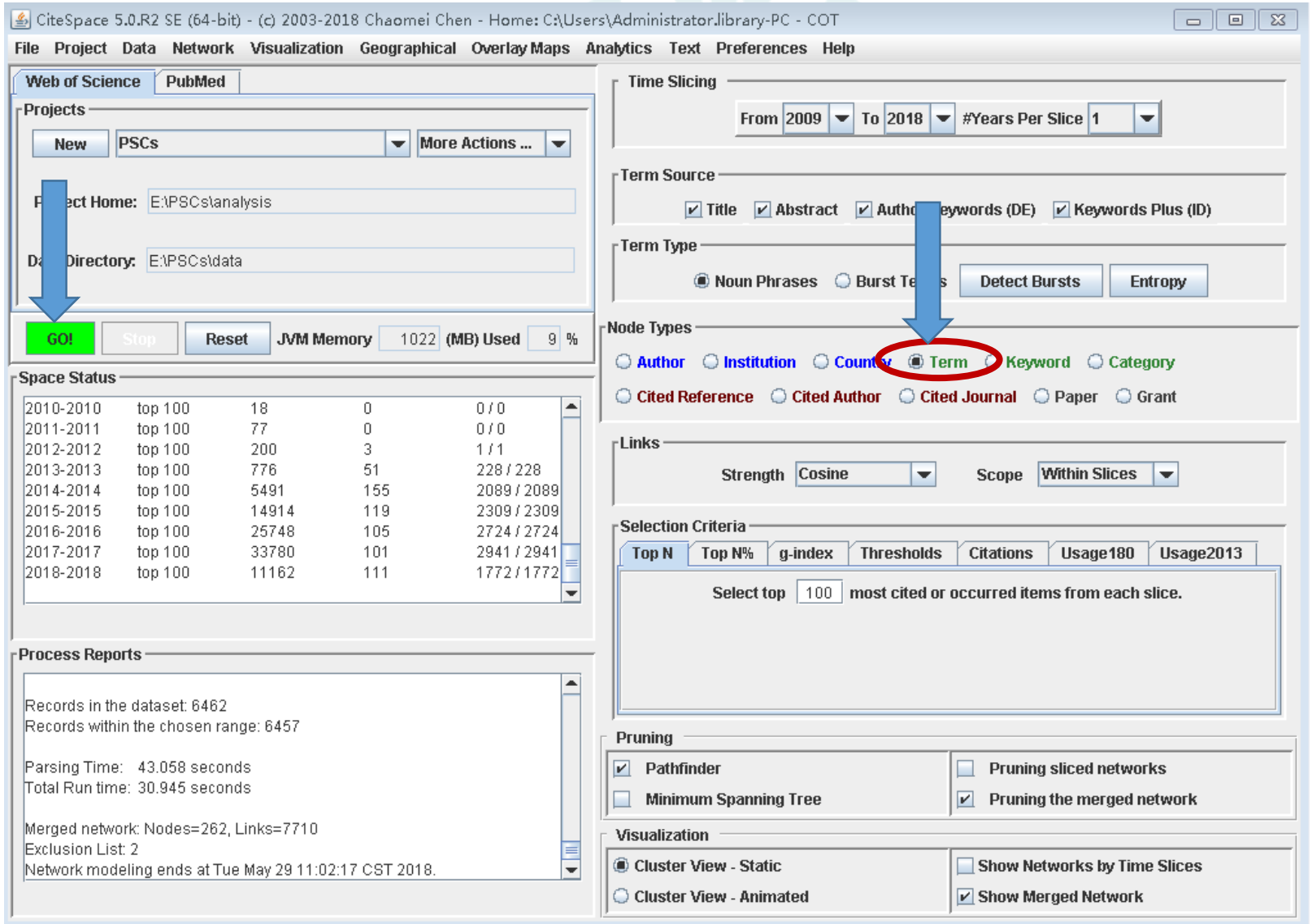
2. 在Space status中出现主题提取的years…Uniquesource records,表示提取过程结束



07

主题共现分析——名词性术语共现分析

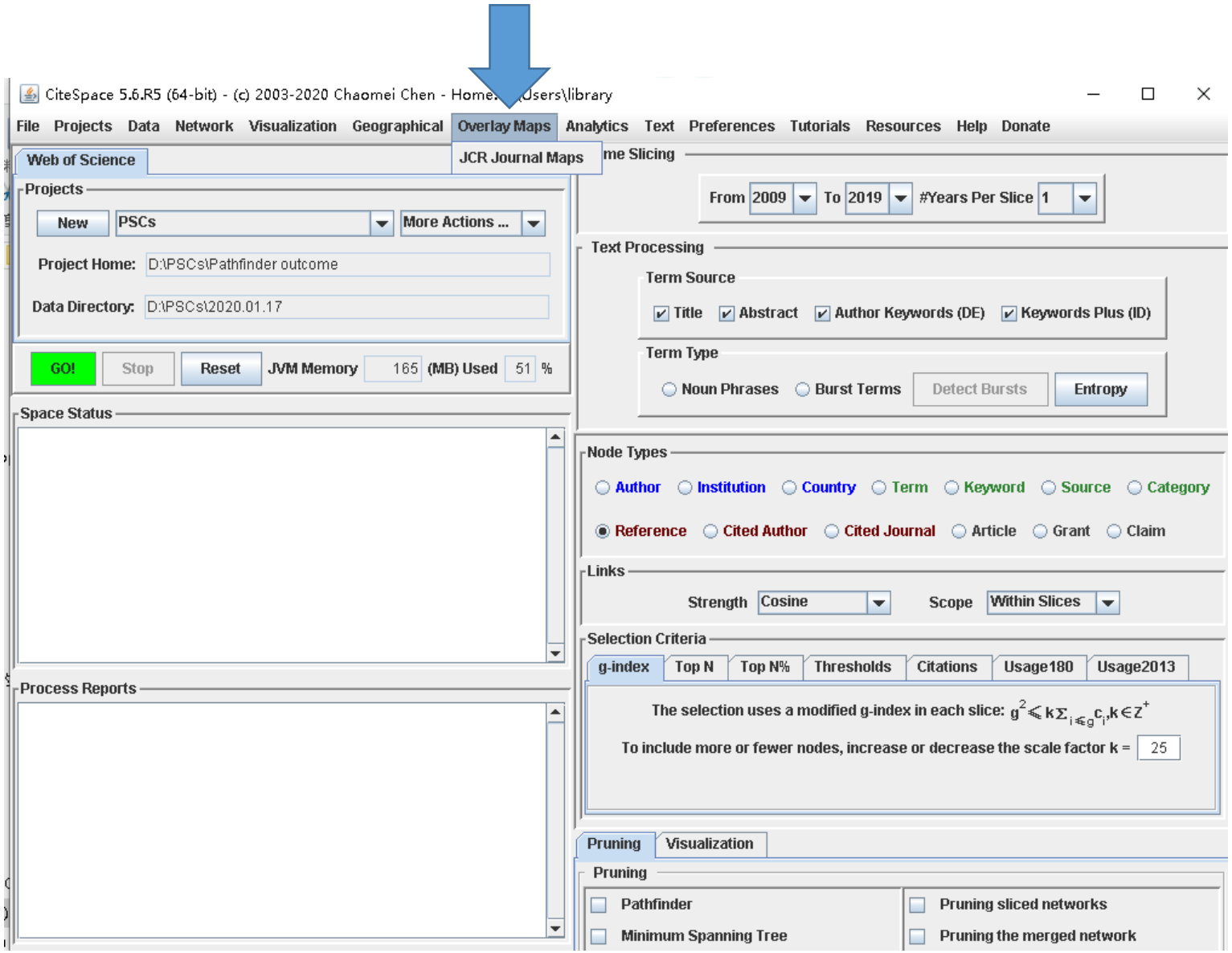
3.节点类型选择Term，并点击GO



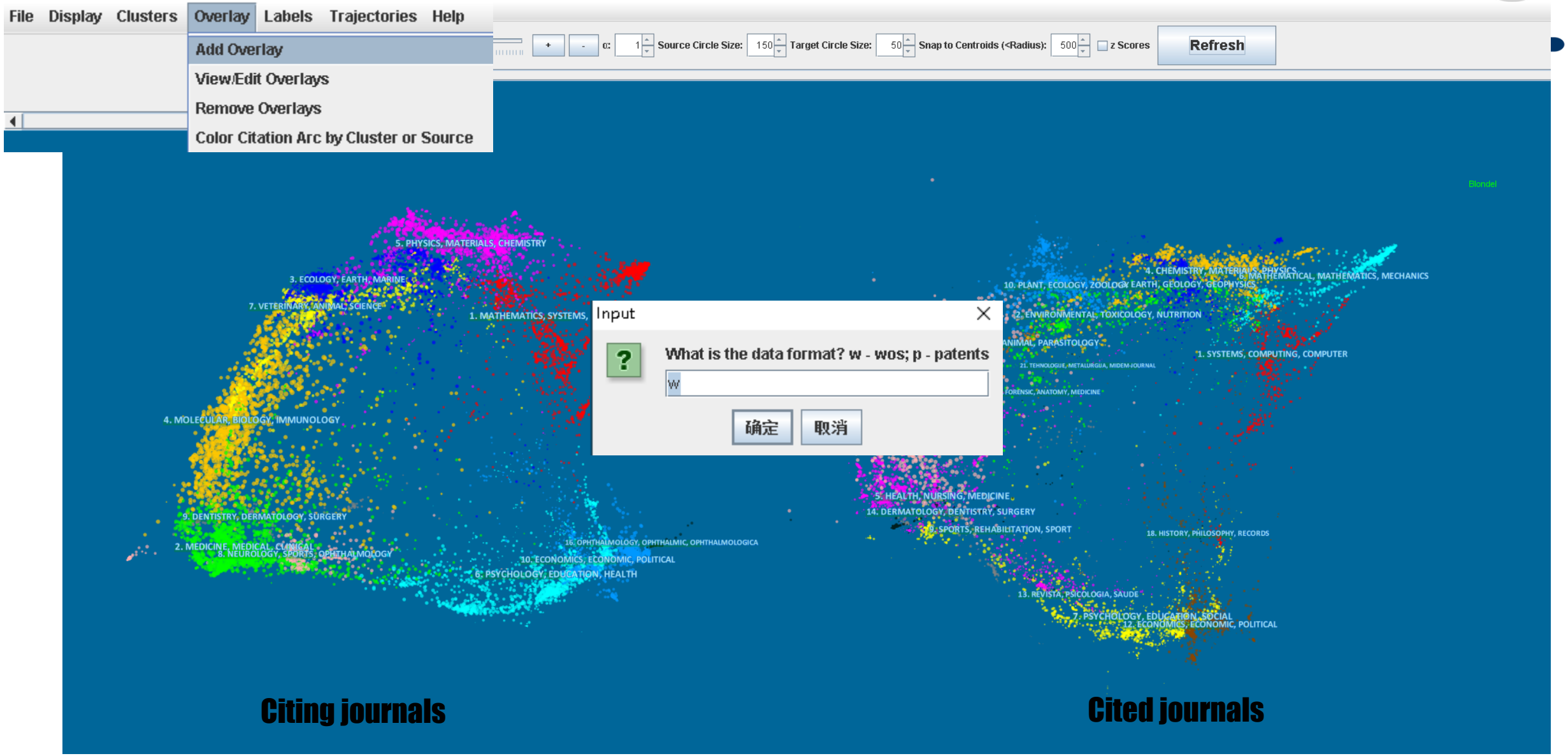
07 主题共现分析——名词性术语共现分析

4.可视化结果

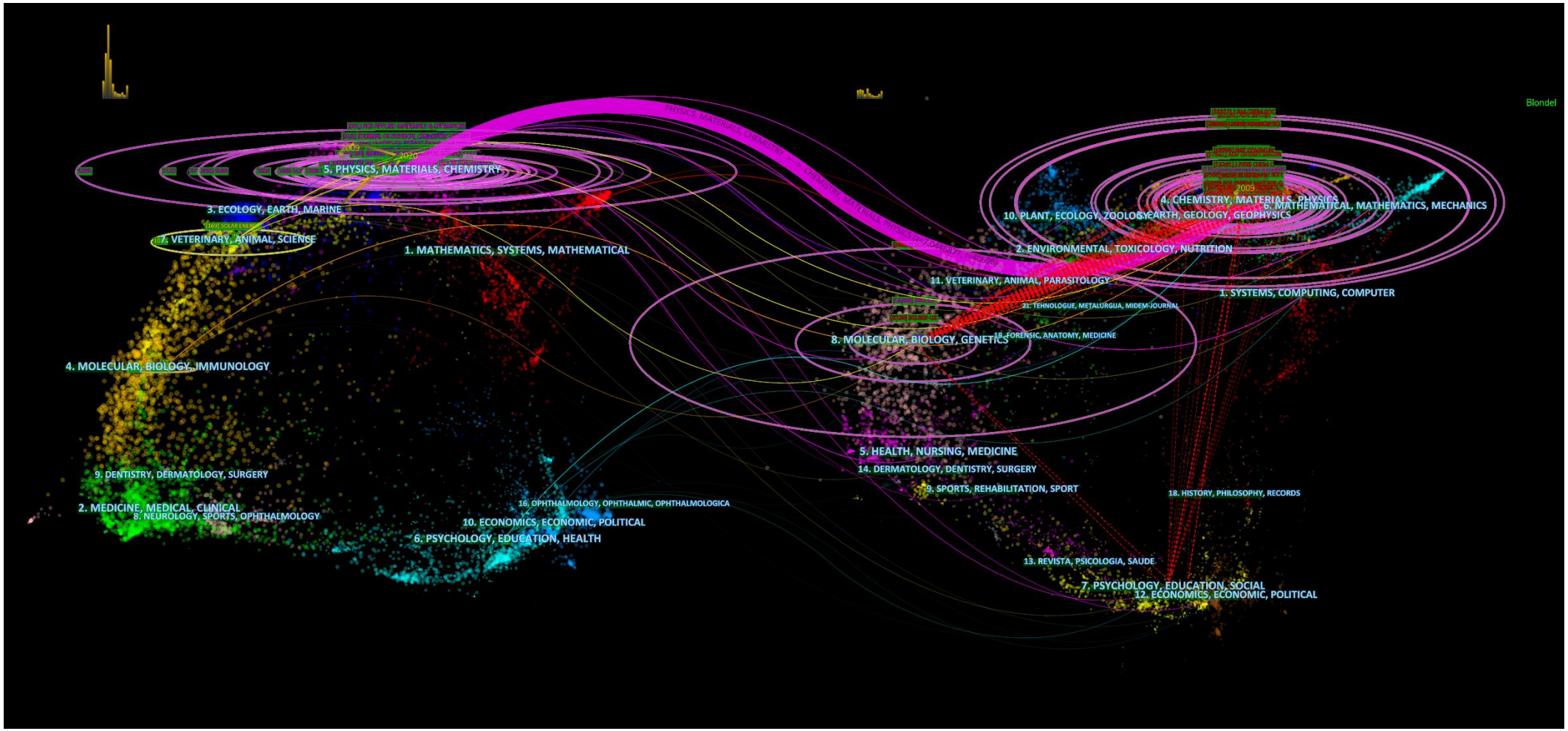
08 Dual-map overlay——Journal



08 Dual-map overlay——Journal



08 Dual-map overlay——Journal

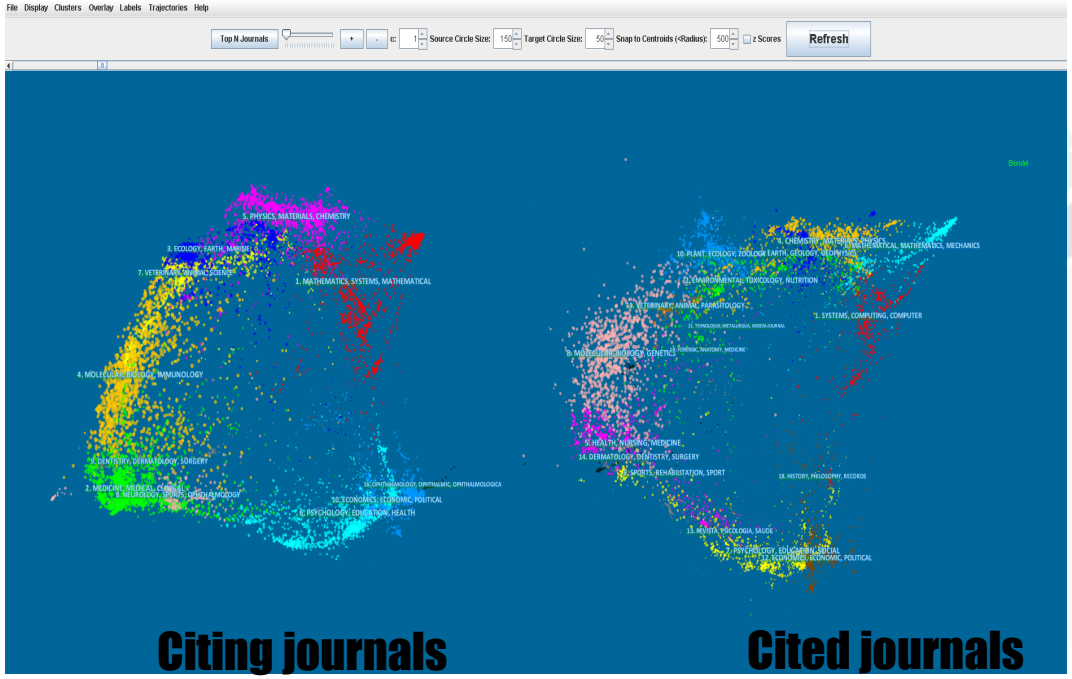


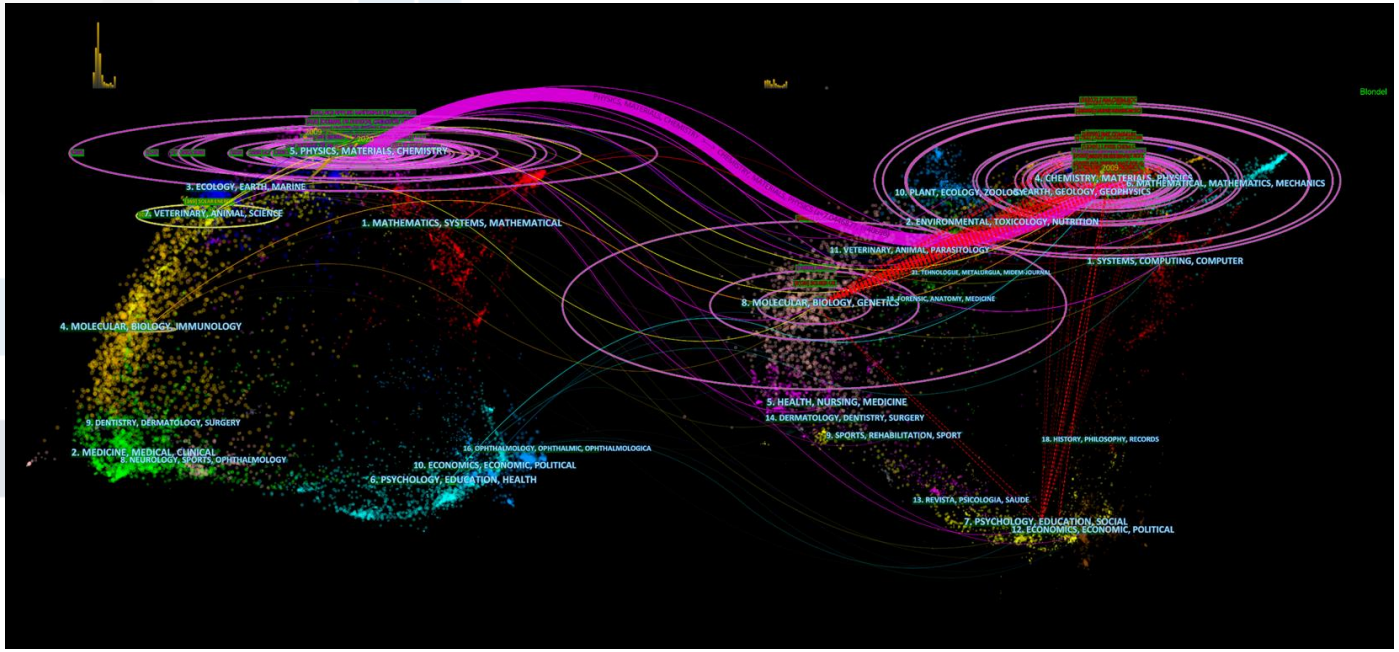
Citing journals

Cited journals

四 CiteSpace图谱解读

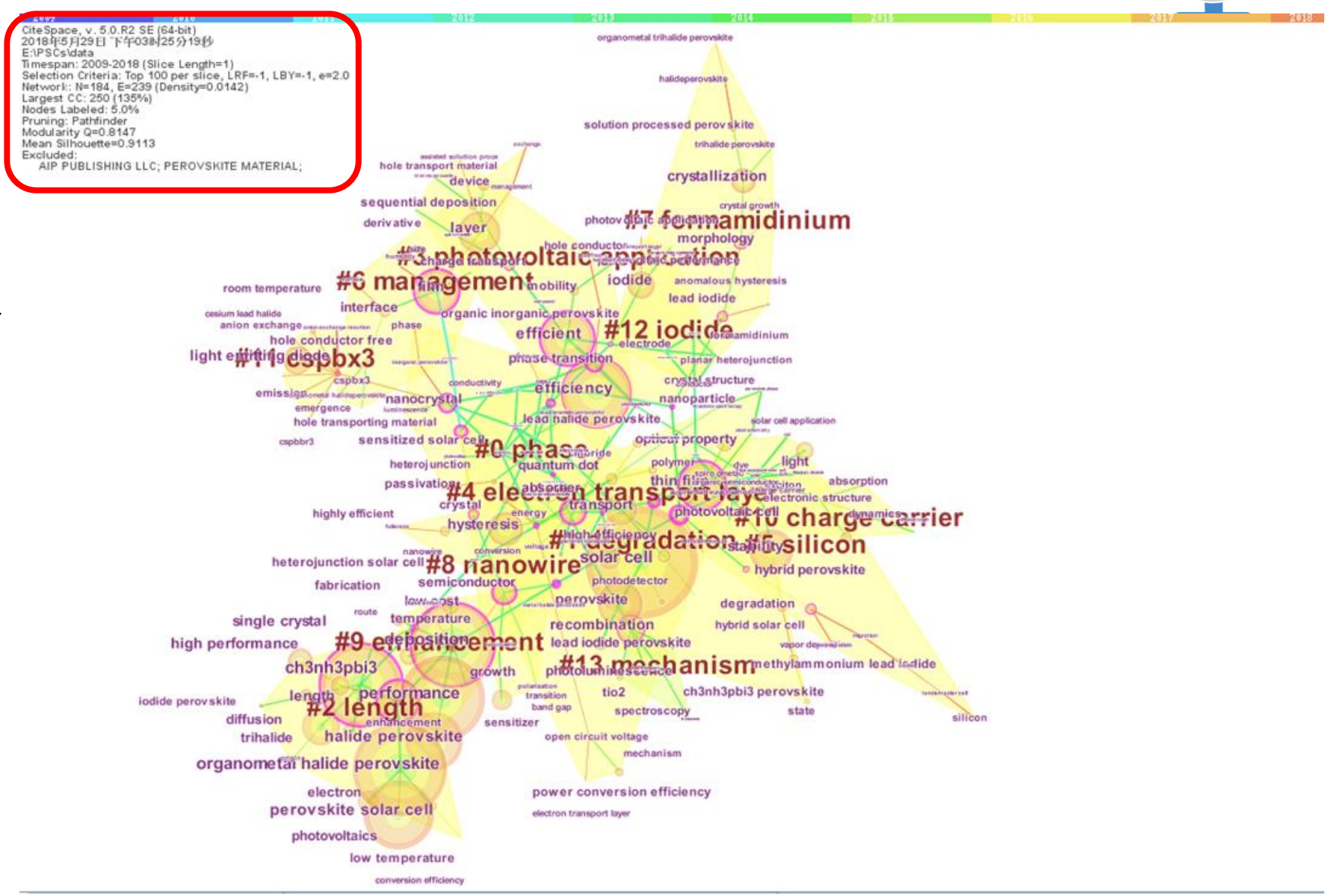
08 Dual-map overlay——Journal





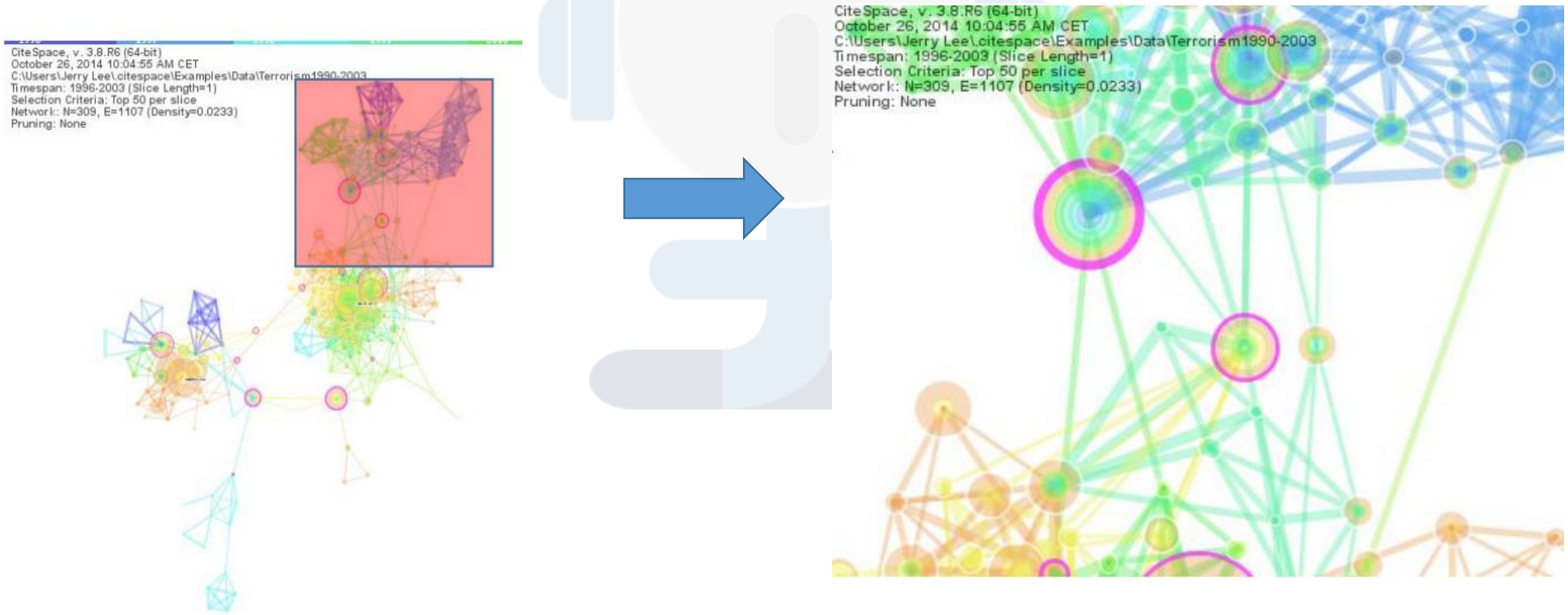
02 CiteSpace相关术语和参数

- the modularity Q and the mean silhouette scores： 这两个参数体现分析所形成的网络的质量。
- Q=[0, 1]。体现所获得的聚类网络是否合理，一般在0.3～1之间是合理的
- the mean silhouette =[0, 1]。体现聚类的同质性（均一性），越大，聚类成员的一致性越好，各个聚类的大小相对比较合理。但是，如果某个聚类较小，则其该参数值越高并不能说明什么。
- 节点的数量、共引线数及网络的密度



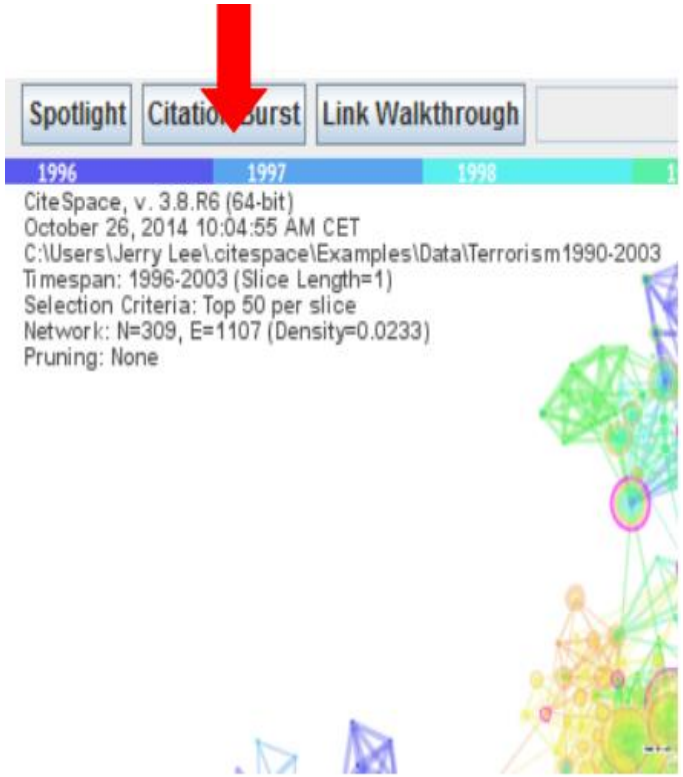
02 CiteSpace相关术语和参数

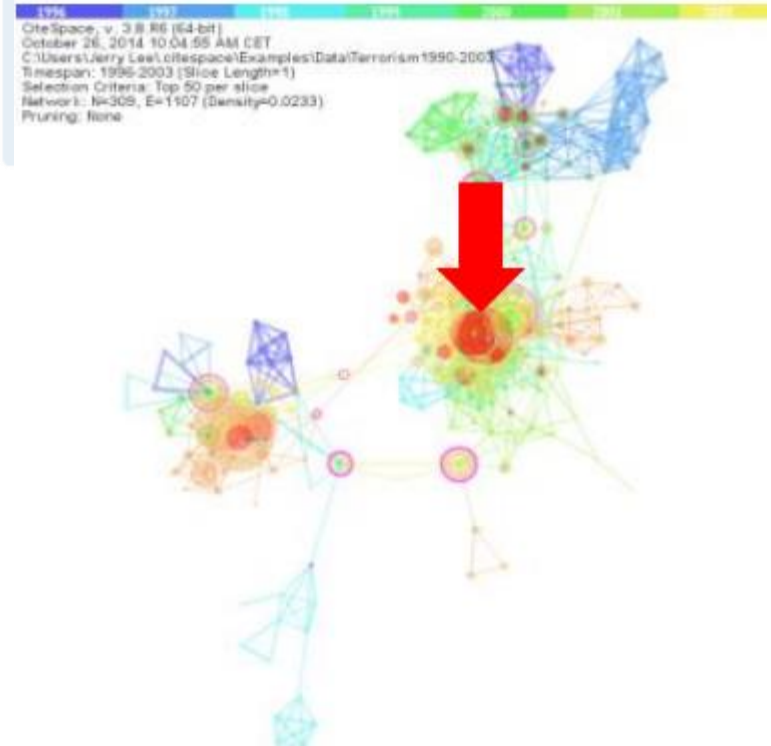
- Betweenness centrality：中介中心性是测度节点在网络中重要性的一个指标。CiteSpace 中使用此指标来发现和衡量文献的重要性，并用紫色圈对该类文献（或作者、期刊以及机构等）进行重点进行标注。

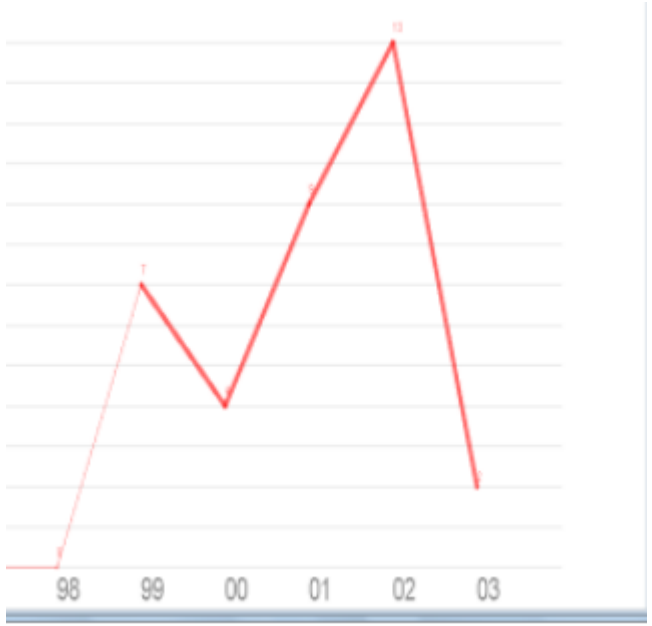


02 CiteSpace相关术语和参数

- Burst 检测：突发主题（或文献、作者以及期刊引证信息等）。在 CiteSpace 中使用 Kleinberg, J（2002）年提出的算法进行检测。（图中红色节点）

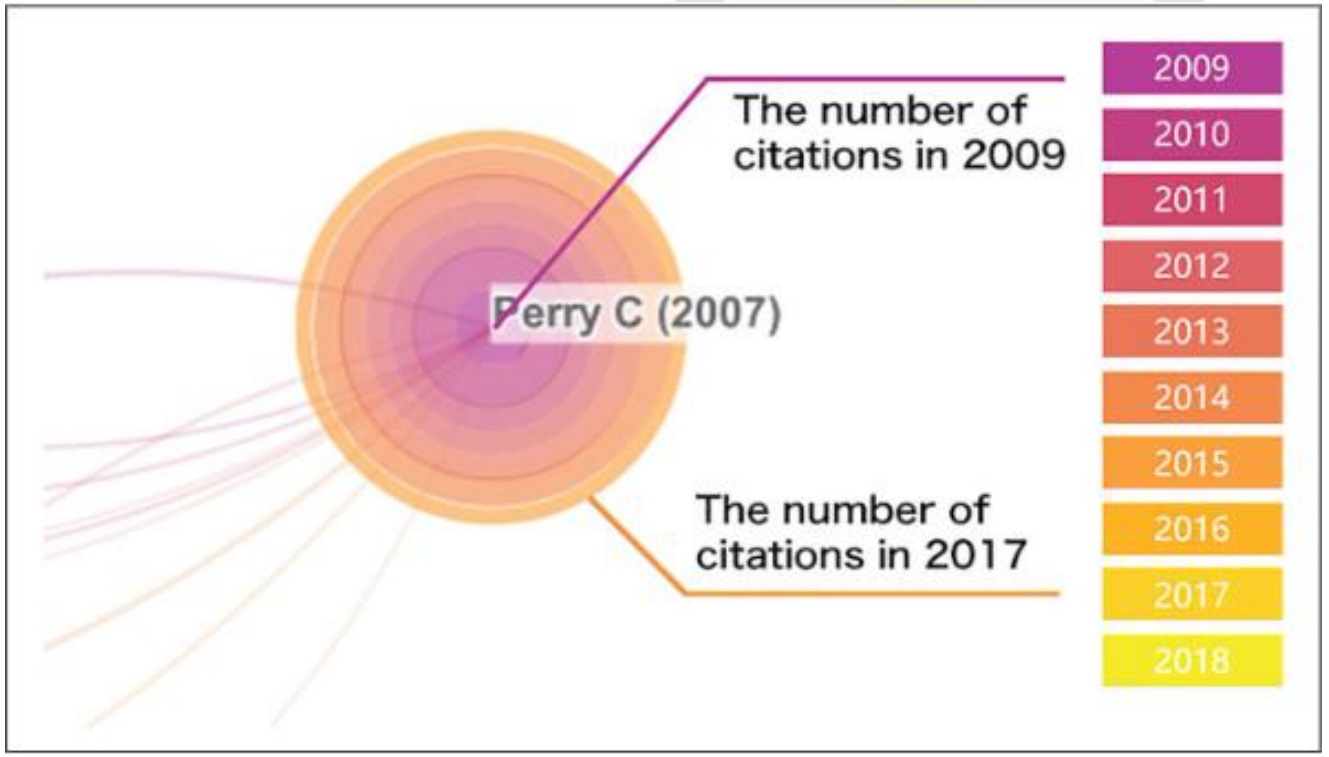






02 CiteSpace中几个重要的分析指标

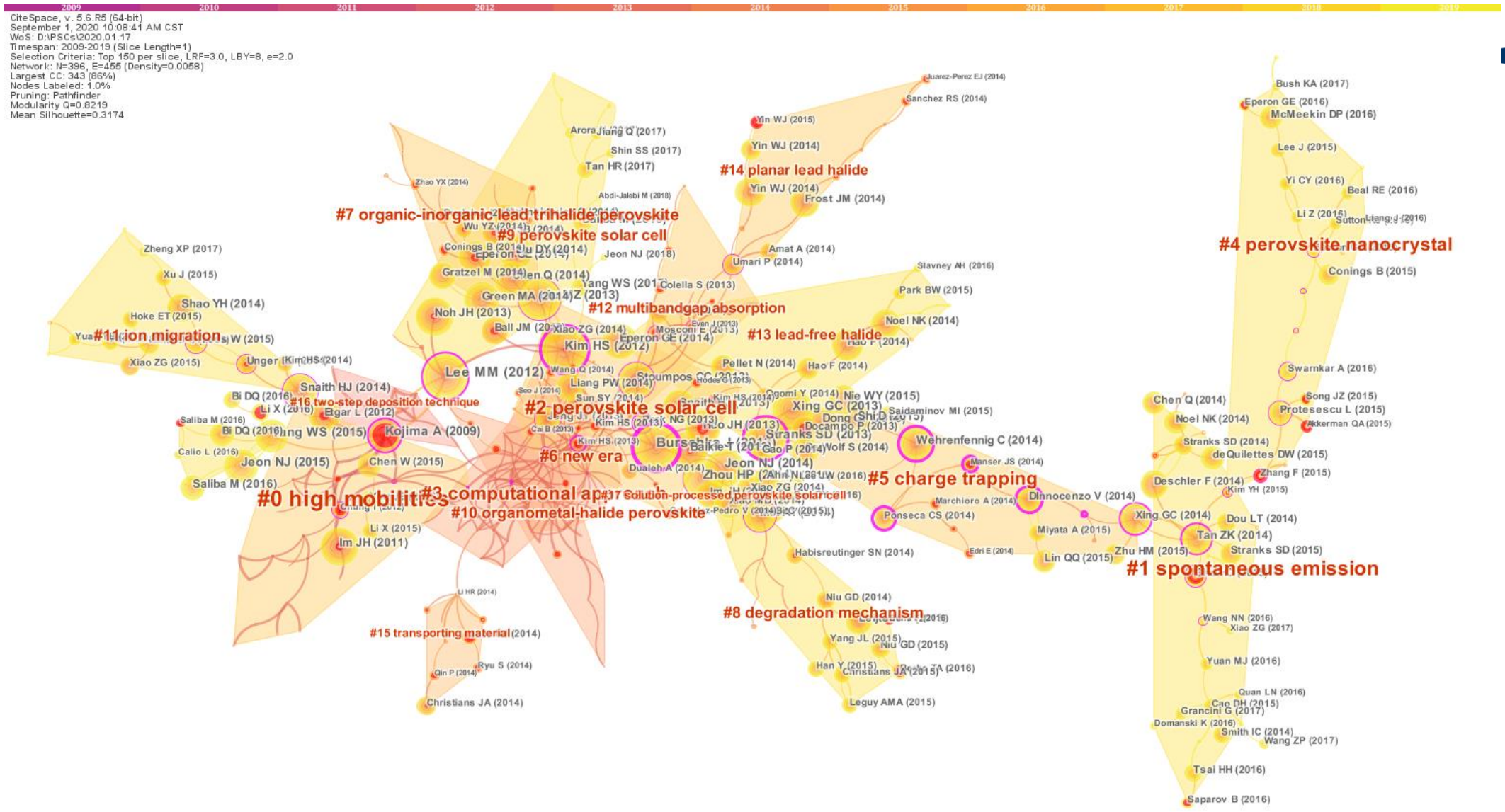
- Citation tree-rings： 引文年轮–代表着某篇文章的引文历史。引文年轮的颜色与时间切片的颜色相对应，一个年轮厚度和与相应时间分区内引文数量成正比。
- 共引线的颜色与首次发生共引的时间切片的颜色相对应



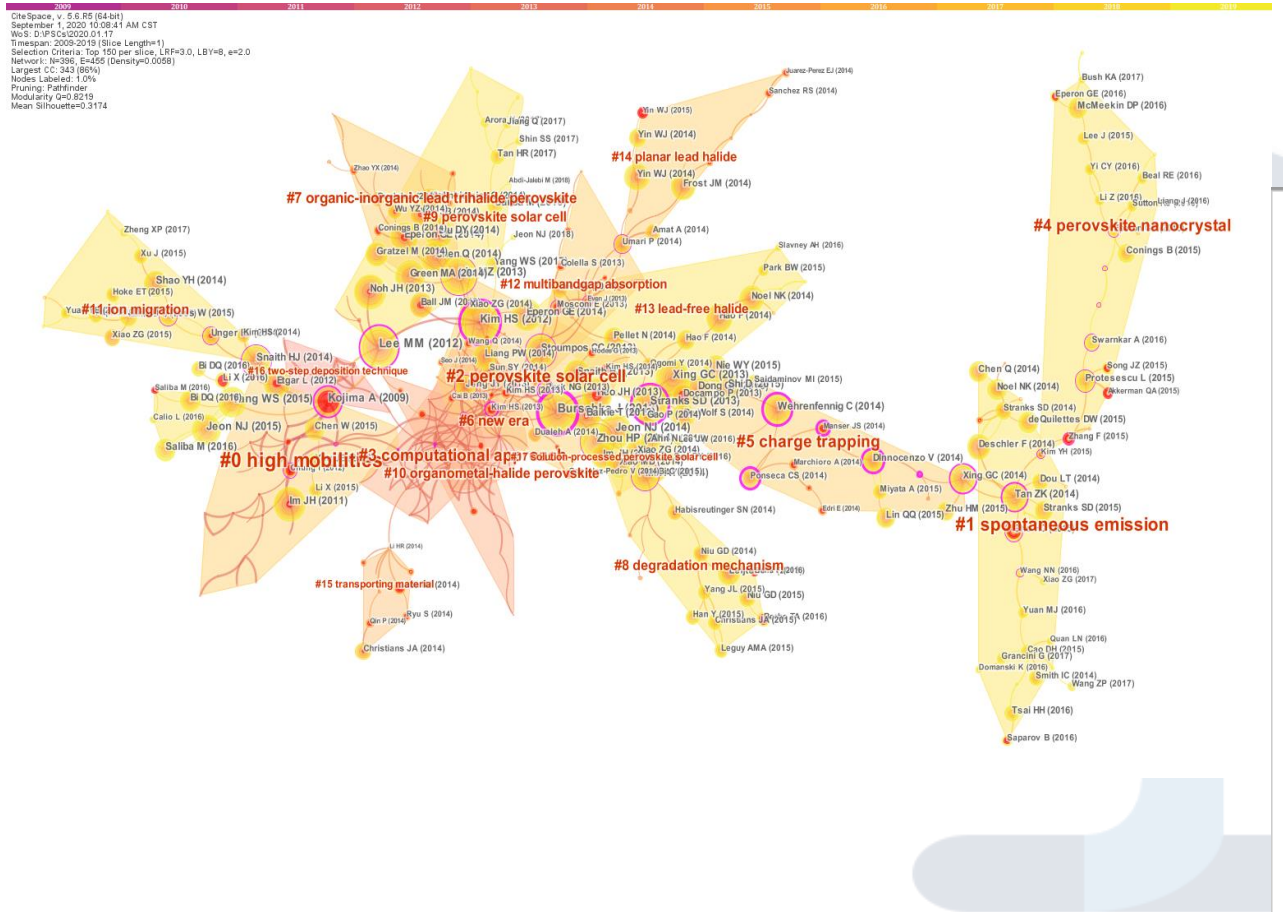
02 CiteSpace相关术语和参数

Term	Description
Co-citation network	• A knowledge network represents how frequently two references are cited by other articles simultaneously. For instance, if two references are cited by a third or different articles, there may be a stronger correlation between them (*Chen et al., 2014, https://doi.org/10.1517/14712598.2014.920813; Small, 1973, https://doi.org/10.1002/asi.4630240406*).
	• Co-citation literature represents the knowledge foundation and development of the given field (*Chen et al., 2010, https://doi.org/10.1002/asi.21309; Small, 1973, https://doi.org/10.1002/asi.4630240406*).
Cluster	• The synthesized network is divided into clusters of cited references.
	• Thematic patterns of each cluster are identified based on noun phrases extracted from citing articles' titles and abstracts; then, the most representative noun phrases are further computed to identify the label of the cluster (*Chen & Song, 2019, https://doi.org/10.1002/asi.4630240406*).
Modularity Q	• Modularity Q > 0.3 means that the separated social structures in the given field are clearly defined in terms of co-citation clusters (*Chen, 2016, CiteSpace: A Practical Guide for Mapping Scientific Literature . Nova Science ; Chen et al., 2010, https://doi.org/10.1002/asi.21309*).
Silhouette	• Silhouette > 0.5 means that the clustering effects are reasonable, and the level of homogeneity is relatively high, suggesting that each cluster is well matched with each other (*Chen, 2016; Chen et al., 2010*).
Log-likelihood ratio (LLR) tests	• The LLR tests are considered to recognize labels effectively within the cluster; these labels are used to name clusters with better representativeness (*Chen et al., 2010, 2012*)
Size	• Size denotes the number of cited references in each cluster.
	• Clusters with few members tend to be less representative than larger ones, since small clusters are susceptible to the citing behavior of a small number of articles (*Chen, 2012, https://doi.org/10.1517/14712598.2012.674507*).
Betweenness centrality (BC)	• BC value is commonly used as structural metric for qualifying the academic impact of one reference in citation networks (*Li & Chen, 2016, CiteSpace: Text mining and visualization in scientific literature Capital University of Economics and Business Press.*).
	• Nodes with high BC (whose BC value > 0.1) tend to identify boundary spanning potentials that may lead to transformative discoveries (*Chen, 2017 , https://doi.org/10.1515/jdis-2017–0006; Chen et al., 2009, https://doi.org/10.1016/j.joi.2009.03.004; Schierz et al., 2010, https://doi. org/10.1016/j.joi.2009.03.004*).
Citation Burstness (CB)	• CB is a computational technique that has been used to identify references attracting increased attention to the underlying research and to trace the development of study focus (*Chen, 2017; Kleinberg, 2003 , https://doi.org/10.1515/jdis-2017–0006*).
Sigma	• The sigma score is a combinant metric of the BC and the citation burstness of the cited reference (*Chen, 2017*).
	• A cited reference with high sigma score reflects its structural and temporal significance (*Chen, 2017*).

03 文献共被引图谱


2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
CiteSpace, v. 5.6.R5 (64-bit)
September 1, 2020 10:08:41 AM CST
WoS: D:\PSCs\2020.01.17
Timespan: 2009-2019 (Slice Length=1)
Selection Criteria: Top 150 per slice, LRF=3.0, LBY=8, e=2.0
Network: N=396, E=455 (Density=0.0058)
Largest CC: 343 (86%)
Nodes Labeled: 1.0%
Pruning: Pathfinder
Modularity Q=0.8219
Mean Silhouette=0.3174
#0 high mobilities
#1 spontaneous emission
#2 perovskite solar cell
#3 computational ap...
#4 perovskite nanocrystal
#5 charge trapping
#6 new era
#7 organic-inorganic lead trihalide perovskite
#8 degradation mechanism
#9 perovskite solar cell
#10 organometal-halide perovskite
#11 ion migration
#12 multibandgap absorption
#13 lead-free halide
#14 planar lead halide
#15 transporting material
#16 two-step deposition technique
#17 solution-processed perovskite solar cell
Lee MM (2012)
Kim HS (2012)
Kojima A (2009)
Im JH (2011)
Snaith HJ (2014)
Burschka J (2013)
Jeon NJ (2015)
Jeon NJ (2014)
Zhou HP (2014)
Xing GC (2013)
Stranks SD (2013)
Wehrenfennig C (2014)
Dinnocenzo V (2014)
Xing GC (2014)
Tan ZK (2014)
Stranks SD (2015)
Zhu HM (2015)
Lin QQ (2015)
Miyata A (2015)
Ponseca CS (2014)
Habisreutinger SN (2014)
Leguy AMA (2015)
Christians JA (2014)
Christians JA (2015)
Niu GD (2014)
Niu GD (2015)
Yang JL (2015)
Han Y (2015)
Yin WJ (2014)
Yin WJ (2015)
Frost JM (2014)
Amat A (2014)
Umari P (2014)
Colella S (2013)
Noh JH (2013)
Green MA (2014)
Eperon GE (2014)
Noel NK (2014)
Park BW (2015)
Slavney AH (2016)
Pellet N (2014)
Hao F (2014)
Bush KA (2017)
Eperon GE (2016)
McMeekin DP (2016)
Lee J (2015)
Yi CY (2016)
Beal RE (2016)
Li Z (2016)
Conings B (2015)
Swarnkar A (2016)
Song JZ (2015)
Protesescu L (2015)
Akkerman QA (2015)
Chen Q (2014)
Noel NK (2014)
Stranks SD (2014)
deQuilettes DW (2015)
Zhang F (2015)
Deschler F (2014)
Kim YH (2015)
Dou LT (2014)
Wang NN (2016)
Xiao ZG (2017)
Yuan MJ (2016)
Quan LN (2016)
Grancini G (2017)
Domanski K (2016)
Smith IC (2014)
Wang ZP (2017)
Tsai HH (2016)
Saparov B (2016)

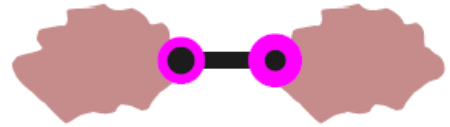
03 文献共被引图谱



Expected Patterns

- Thematic grouping

- Intellectual turning points

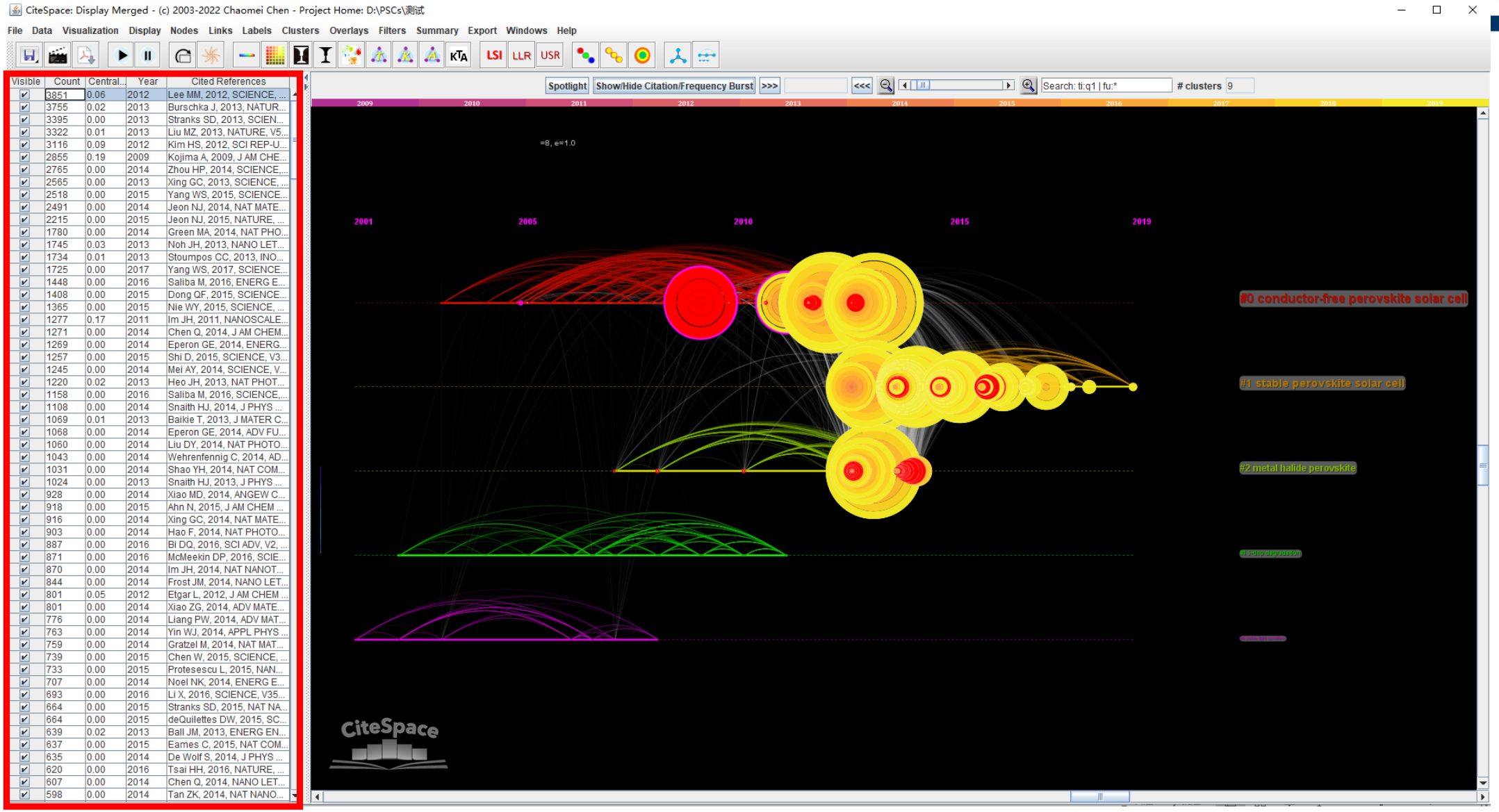


- Thematic change over time

- Abrupt changes associated with triggers

03 文献共被引分析

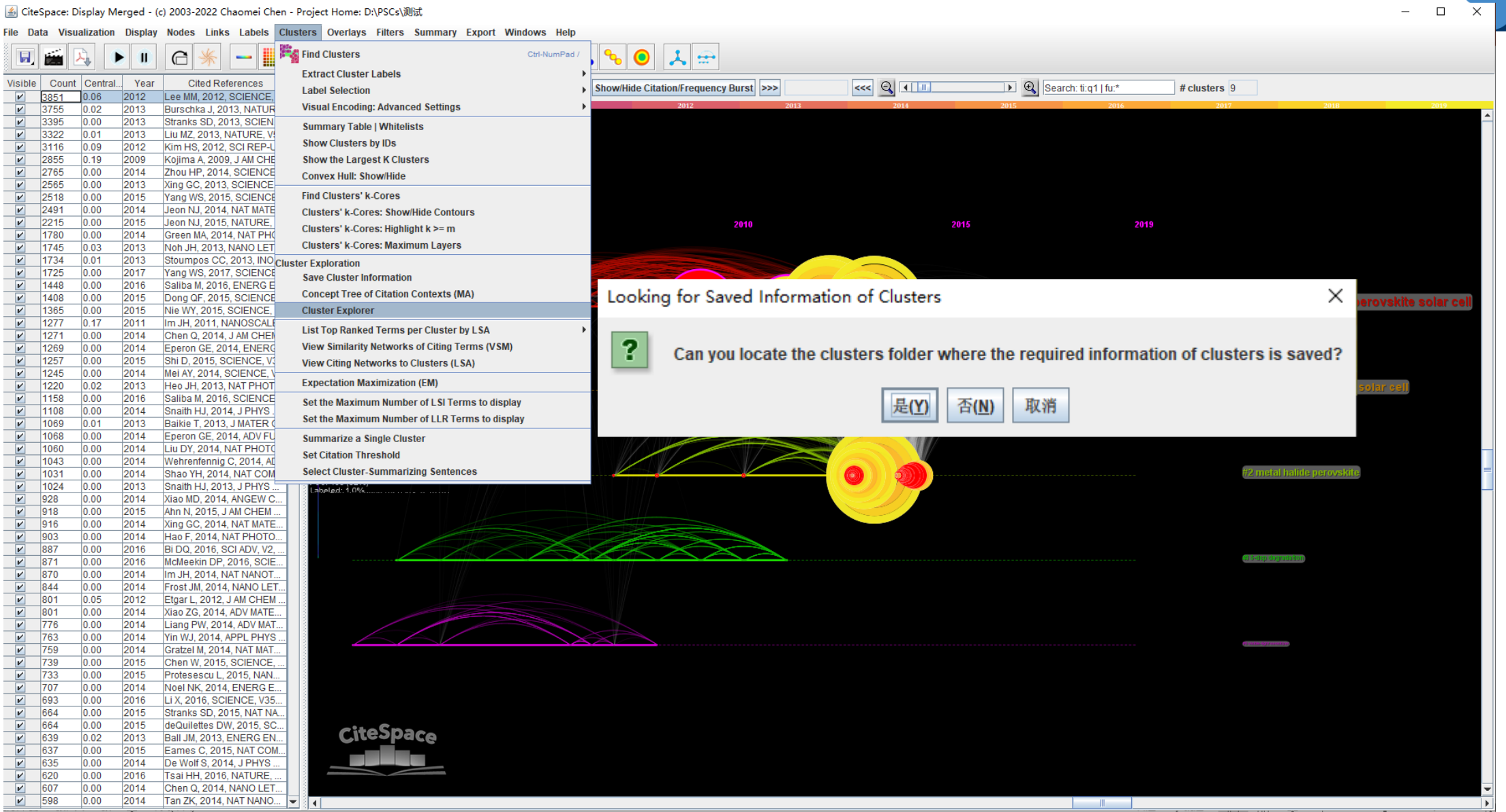
详细信息查询



Visible	Count	Central...	Year	Cited References
☑	3851	0.06	2012	Lee MM, 2012, SCIENCE, ...
☑	3755	0.02	2013	Burschka J, 2013, NATUR...
☑	3395	0.00	2013	Stranks SD, 2013, SCIEN...
☑	3322	0.01	2013	Liu MZ, 2013, NATURE, V5...
☑	3116	0.09	2012	Kim HS, 2012, SCI REP-U...
☑	2855	0.19	2009	Kojima A, 2009, J AM CHE...
☑	2765	0.00	2014	Zhou HP, 2014, SCIENCE,...
☑	2565	0.00	2013	Xing GC, 2013, SCIENCE, ...
☑	2518	0.00	2015	Yang WS, 2015, SCIENCE...
☑	2491	0.00	2014	Jeon NJ, 2014, NAT MATE...
☑	2215	0.00	2015	Jeon NJ, 2015, NATURE, ...
☑	1780	0.00	2014	Green MA, 2014, NAT PHO...
☑	1745	0.03	2013	Noh JH, 2013, NANO LET...
☑	1734	0.01	2013	Stoumpos CC, 2013, INO...
☑	1725	0.00	2017	Yang WS, 2017, SCIENCE...
☑	1448	0.00	2016	Saliba M, 2016, ENERG E...
☑	1408	0.00	2015	Dong QF, 2015, SCIENCE...
☑	1365	0.00	2015	Nie WY, 2015, SCIENCE, ...
☑	1277	0.17	2011	Im JH, 2011, NANOSCALE...
☑	1271	0.00	2014	Chen Q, 2014, J AM CHEM...
☑	1269	0.00	2014	Eperon GE, 2014, ENERG...
☑	1257	0.00	2015	Shi D, 2015, SCIENCE, V3...
☑	1245	0.00	2014	Mei AY, 2014, SCIENCE, V...
☑	1220	0.02	2013	Heo JH, 2013, NAT PHOT...
☑	1158	0.00	2016	Saliba M, 2016, SCIENCE,...
☑	1108	0.00	2014	Snaith HJ, 2014, J PHYS ...
☑	1069	0.01	2013	Baikie T, 2013, J MATER C...
☑	1068	0.00	2014	Eperon GE, 2014, ADV FU...
☑	1060	0.00	2014	Liu DY, 2014, NAT PHOTO...
☑	1043	0.00	2014	Wehrenfennig C, 2014, AD...
☑	1031	0.00	2014	Shao YH, 2014, NAT COM...
☑	1024	0.00	2013	Snaith HJ, 2013, J PHYS ...
☑	928	0.00	2014	Xiao MD, 2014, ANGEW C...
☑	918	0.00	2015	Ahn N, 2015, J AM CHEM ...
☑	916	0.00	2014	Xing GC, 2014, NAT MATE...
☑	903	0.00	2014	Hao F, 2014, NAT PHOTO...
☑	887	0.00	2016	Bi DQ, 2016, SCI ADV, V2, ...
☑	871	0.00	2016	McMeekin DP, 2016, SCIE...
☑	870	0.00	2014	Im JH, 2014, NAT NANOT...
☑	844	0.00	2014	Frost JM, 2014, NANO LET...
☑	801	0.05	2012	Etgar L, 2012, J AM CHEM ...
☑	801	0.00	2014	Xiao ZG, 2014, ADV MATE...
☑	776	0.00	2014	Liang PW, 2014, ADV MAT...
☑	763	0.00	2014	Yin WJ, 2014, APPL PHYS ...
☑	759	0.00	2014	Gratzel M, 2014, NAT MAT...
☑	739	0.00	2015	Chen W, 2015, SCIENCE, ...
☑	733	0.00	2015	Protesescu L, 2015, NAN...
☑	707	0.00	2014	Noel NK, 2014, ENERG E...
☑	693	0.00	2016	Li X, 2016, SCIENCE, V35...
☑	664	0.00	2015	Stranks SD, 2015, NAT NA...
☑	664	0.00	2015	deQuilettes DW, 2015, SC...
☑	639	0.02	2013	Ball JM, 2013, ENERG EN...
☑	637	0.00	2015	Eames C, 2015, NAT COM...
☑	635	0.00	2014	De Wolf S, 2014, J PHYS ...
☑	620	0.00	2016	Tsai HH, 2016, NATURE, ...
☑	607	0.00	2014	Chen Q, 2014, NANO LET...
☑	598	0.00	2014	Tan ZK, 2014, NAT NANO...

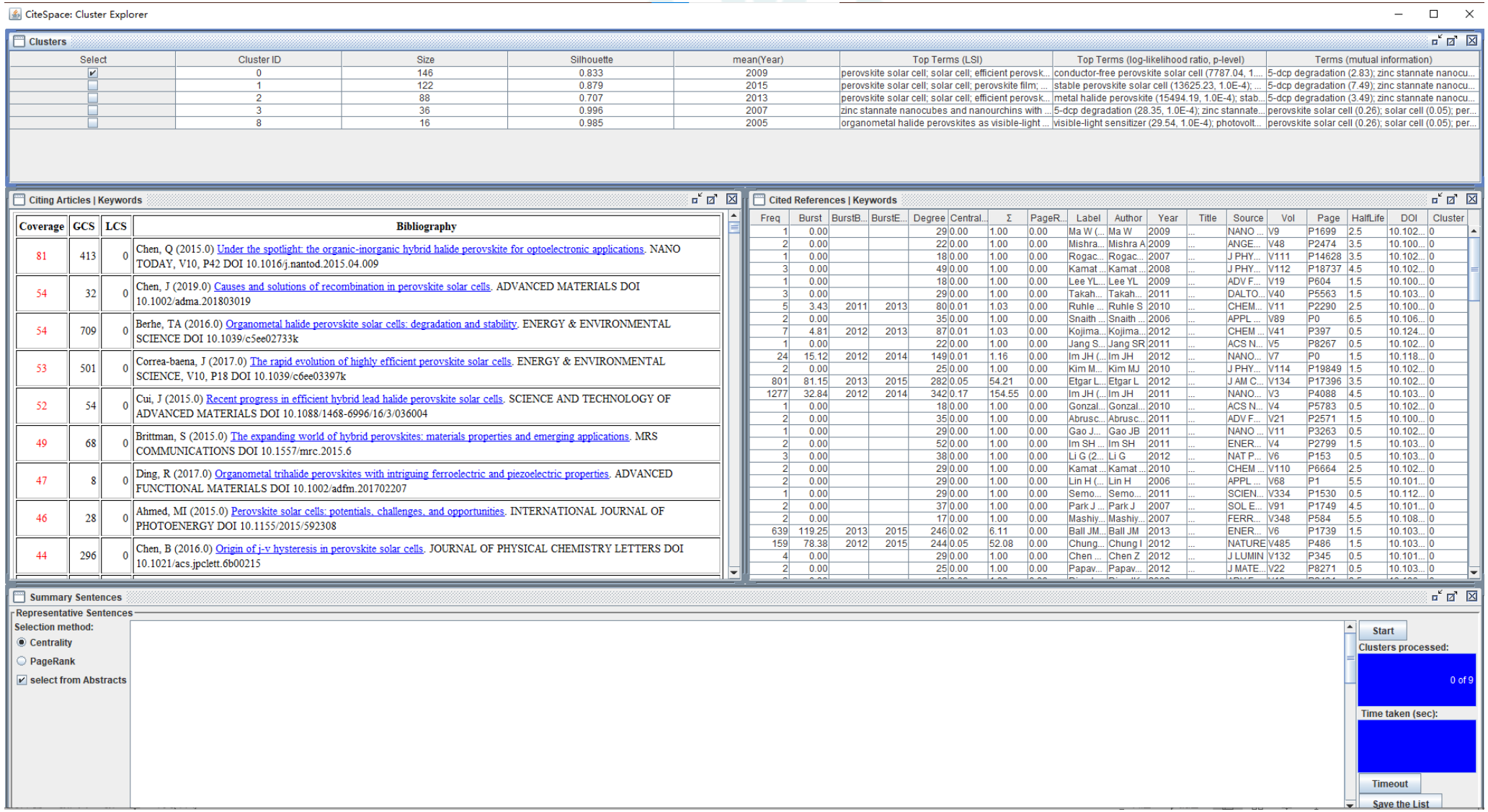
03 文献共被引分析

详细信息查询



03 文献共被引分析

以下将对获得的三个重要的窗口进行解释



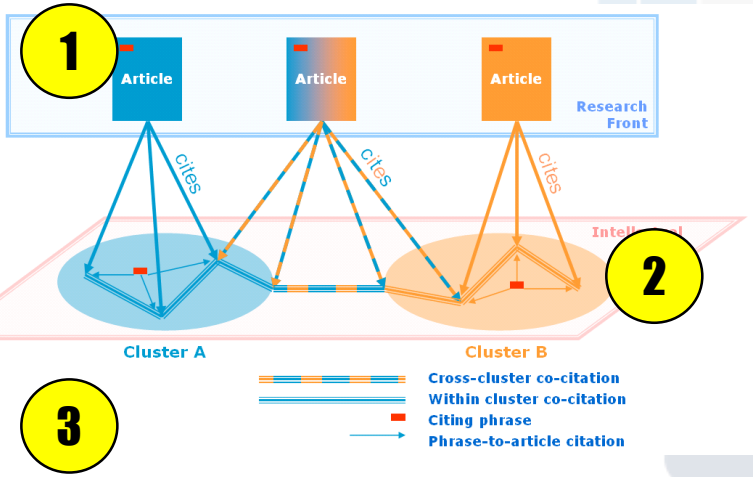
Select	Cluster ID	Size	Silhouette	mean(Year)	Top Terms (LSI)	Top Terms (log-likelihood ratio, p-level)	Terms (mutual information)
☑	0	146	0.833	2009	perovskite solar cell; solar cell; efficient perovsk...	conductor-free perovskite solar cell (7787.04, 1....	5-dcp degradation (2.83); zinc stannate nanocu...
☐	1	122	0.879	2015	perovskite solar cell; solar cell; perovskite film; ...	stable perovskite solar cell (13625.23, 1.0E-4); ...	5-dcp degradation (7.49); zinc stannate nanocu...
☐	2	88	0.707	2013	perovskite solar cell; solar cell; efficient perovsk...	metal halide perovskite (15494.19, 1.0E-4); stab...	5-dcp degradation (3.49); zinc stannate nanocu...
☐	3	36	0.996	2007	zinc stannate nanocubes and nanourchins with ...	5-dcp degradation (28.35, 1.0E-4); zinc stannate...	perovskite solar cell (0.26); solar cell (0.05); per...
☐	8	16	0.985	2005	organometal halide perovskites as visible-light ...	visible-light sensitizer (29.54, 1.0E-4); photovolt...	perovskite solar cell (0.26); solar cell (0.05); per...

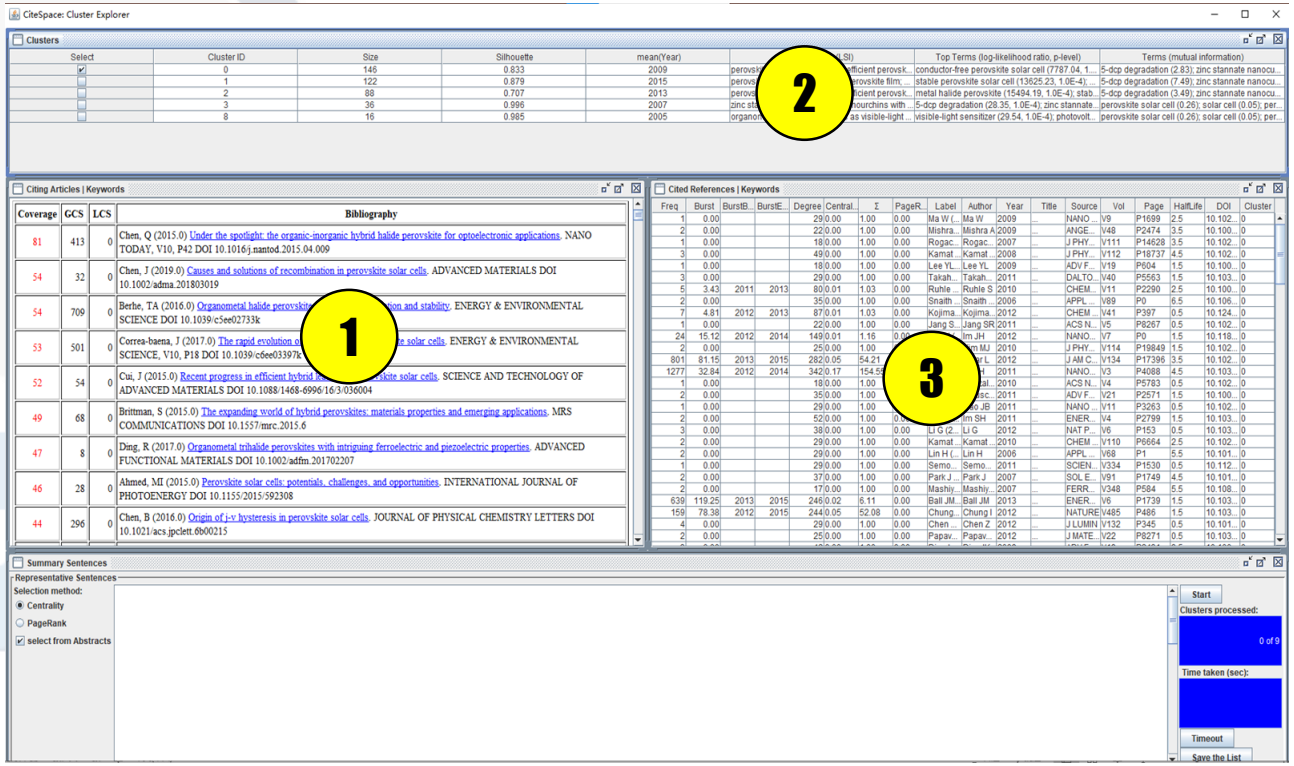
Coverage	GCS	LCS	Bibliography
81	413	0	Chen, Q (2015.0) Under the spotlight: the organic-inorganic hybrid halide perovskite for optoelectronic applications. NANO TODAY, V10, P42 DOI 10.1016/j.nantod.2015.04.009
54	32	0	Chen, J (2019.0) Causes and solutions of recombination in perovskite solar cells. ADVANCED MATERIALS DOI 10.1002/adma.201803019
54	709	0	Berhe, TA (2016.0) Organometal halide perovskite solar cells: degradation and stability. ENERGY & ENVIRONMENTAL SCIENCE DOI 10.1039/c5ee02733k
53	501	0	Correa-baena, J (2017.0) The rapid evolution of highly efficient perovskite solar cells. ENERGY & ENVIRONMENTAL SCIENCE, V10, P18 DOI 10.1039/c6ee03397k
52	54	0	Cui, J (2015.0) Recent progress in efficient hybrid lead halide perovskite solar cells. SCIENCE AND TECHNOLOGY OF ADVANCED MATERIALS DOI 10.1088/1468-6996/16/3/036004
49	68	0	Brittman, S (2015.0) The expanding world of hybrid perovskites: materials properties and emerging applications. MRS COMMUNICATIONS DOI 10.1557/mrc.2015.6
47	8	0	Ding, R (2017.0) Organometal trihalide perovskites with intriguing ferroelectric and piezoelectric properties. ADVANCED FUNCTIONAL MATERIALS DOI 10.1002/adfm.201702207
46	28	0	Ahmed, MI (2015.0) Perovskite solar cells: potentials, challenges, and opportunities. INTERNATIONAL JOURNAL OF PHOTOENERGY DOI 10.1155/2015/592308
44	296	0	Chen, B (2016.0) Origin of j-v hysteresis in perovskite solar cells. JOURNAL OF PHYSICAL CHEMISTRY LETTERS DOI 10.1021/acs.jpclett.6b00215

Freq	Burst	BurstB...	BurstE...	Degree	Central...	Σ	PageR...	Label	Author	Year	Title	Source	Vol	Page	HalfLife	DOI	Cluster
1	0.00			29	0.00	1.00	0.00	Ma W (...	Ma W	2009	...	NANO ...	V9	P1699	2.5	10.102...	0
2	0.00			22	0.00	1.00	0.00	Mishra...	Mishra A	2009	...	ANGE...	V48	P2474	3.5	10.100...	0
1	0.00			18	0.00	1.00	0.00	Rogac...	Rogac...	2007	...	J PHY...	V111	P14628	3.5	10.102...	0
3	0.00			49	0.00	1.00	0.00	Kamat ...	Kamat ...	2008	...	J PHY...	V112	P18737	4.5	10.102...	0
1	0.00			18	0.00	1.00	0.00	Lee YL...	Lee YL	2009	...	ADV F...	V19	P604	1.5	10.100...	0
3	0.00			29	0.00	1.00	0.00	Takah...	Takah...	2011	...	DALTO...	V40	P5563	1.5	10.103...	0
5	3.43	2011	2013	80	0.01	1.03	0.00	Ruhle ...	Ruhle S	2010	...	CHEM...	V11	P2290	2.5	10.100...	0
2	0.00			35	0.00	1.00	0.00	Snaith ...	Snaith ...	2006	...	APPL ...	V89	P0	6.5	10.106...	0
7	4.81	2012	2013	87	0.01	1.03	0.00	Kojima...	Kojima...	2012	...	CHEM ...	V41	P397	0.5	10.124...	0
1	0.00			22	0.00	1.00	0.00	Jang S...	Jang SR	2011	...	ACS N...	V5	P8267	0.5	10.102...	0
24	15.12	2012	2014	149	0.01	1.16	0.00	Im JH (...	Im JH	2012	...	NANO...	V7	P0	1.5	10.118...	0
2	0.00			25	0.00	1.00	0.00	Kim M...	Kim MJ	2010	...	J PHY...	V114	P19849	1.5	10.102...	0
801	81.15	2013	2015	282	0.05	54.21	0.00	Etgar L...	Etgar L	2012	...	J AM C...	V134	P17396	3.5	10.102...	0
1277	32.84	2012	2014	342	0.17	154.55	0.00	Im JH (...	Im JH	2011	...	NANO...	V3	P4088	4.5	10.103...	0
1	0.00			18	0.00	1.00	0.00	Gonzal...	Gonzal...	2010	...	ACS N...	V4	P5783	0.5	10.102...	0
2	0.00			35	0.00	1.00	0.00	Abrusc...	Abrusc...	2011	...	ADV F...	V21	P2571	1.5	10.100...	0
1	0.00			29	0.00	1.00	0.00	Gao J...	Gao JB	2011	...	NANO ...	V11	P3263	0.5	10.102...	0
2	0.00			52	0.00	1.00	0.00	Im SH ...	Im SH	2011	...	ENER...	V4	P2799	1.5	10.103...	0
3	0.00			38	0.00	1.00	0.00	Li G (2...	Li G	2012	...	NAT P...	V6	P153	0.5	10.103...	0
2	0.00			29	0.00	1.00	0.00	Kamat ...	Kamat ...	2010	...	CHEM ...	V110	P6664	2.5	10.102...	0
2	0.00			29	0.00	1.00	0.00	Lin H (...	Lin H	2006	...	APPL ...	V68	P1	5.5	10.101...	0
1	0.00			29	0.00	1.00	0.00	Semo...	Semo...	2011	...	SCIEN...	V334	P1530	0.5	10.112...	0
2	0.00			37	0.00	1.00	0.00	Park J ...	Park J	2007	...	SOL E...	V91	P1749	4.5	10.101...	0
2	0.00			17	0.00	1.00	0.00	Mashiy...	Mashiy...	2007	...	FERR...	V348	P584	5.5	10.108...	0
639	119.25	2013	2015	246	0.02	6.11	0.00	Ball JM...	Ball JM	2013	...	ENER...	V6	P1739	1.5	10.103...	0
159	78.38	2012	2015	244	0.05	52.08	0.00	Chung...	Chung I	2012	...	NATURE	V485	P486	1.5	10.103...	0
4	0.00			29	0.00	1.00	0.00	Chen ...	Chen Z	2012	...	J LUMIN	V132	P345	0.5	10.101...	0
2	0.00			25	0.00	1.00	0.00	Papav...	Papav...	2012	...	J MATE...	V22	P8271	0.5	10.103...	0

03 文献共被引分析

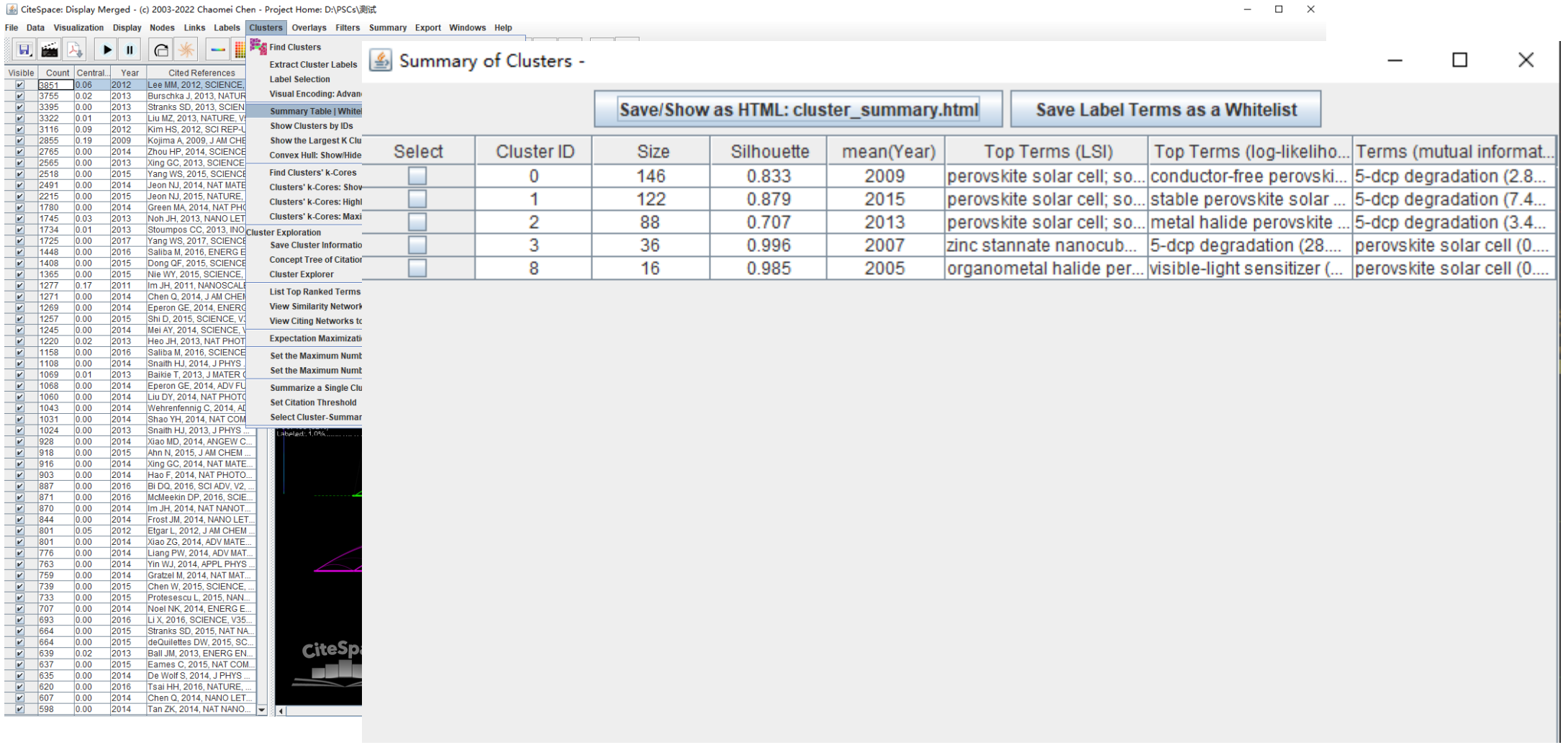
CiteSpace概念模型与软件提供的信息查询比较





03 文献共被引分析

该窗口显示的是通过三种方法得到的聚类命名（反映研究领域涵盖的主题）



该窗口信息还可以通过菜单“Cluster”，“Summary Table /Whitelists”得到

03 文献共被引分析

该窗口显示的施引文献（这些文献代表了研究前沿）。标题中着重标识的词汇正是通过相关方法提取的聚类命名

Citing Articles | Keywords

Coverage	GCS	LCS	Bibliography
81	413	0	Chen, Q (2015.0) Under the spotlight: the organic-inorganic hybrid halide perovskite for optoelectronic applications. NANO TODAY, V10, P42 DOI 10.1016/j.nantod.2015.04.009
54	32	0	Chen, J (2019.0) Causes and solutions of recombination in perovskite solar cells. ADVANCED MATERIALS DOI 10.1002/adma.201803019
54	709	0	Berhe, TA (2016.0) Organometal halide perovskite solar cells: degradation and stability. ENERGY & ENVIRONMENTAL SCIENCE DOI 10.1039/c5ee02733k
53	501	0	Correa-baena, J (2017.0) The rapid evolution of highly efficient perovskite solar cells. ENERGY & ENVIRONMENTAL SCIENCE, V10, P18 DOI 10.1039/c6ee03397k
52	54	0	Cui, J (2015.0) Recent progress in efficient hybrid lead halide perovskite solar cells. SCIENCE AND TECHNOLOGY OF ADVANCED MATERIALS DOI 10.1088/1468-6996/16/3/036004
49	68	0	Brittman, S (2015.0) The expanding world of hybrid perovskites: materials properties and emerging applications. MRS COMMUNICATIONS DOI 10.1557/mrc.2015.6
47	8	0	Ding, R (2017.0) Organometal trihalide perovskites with intriguing ferroelectric and piezoelectric properties. ADVANCED FUNCTIONAL MATERIALS DOI 10.1002/adfm.201702207
46	28	0	Ahmed, MI (2015.0) Perovskite solar cells: potentials, challenges, and opportunities. INTERNATIONAL JOURNAL OF PHOTOENERGY DOI 10.1155/2015/592308
44	296	0	Chen, B (2016.0) Origin of j-v hysteresis in perovskite solar cells. JOURNAL OF PHYSICAL CHEMISTRY LETTERS DOI 10.1021/acs.jpclett.6b00215

03 文献共被引分析

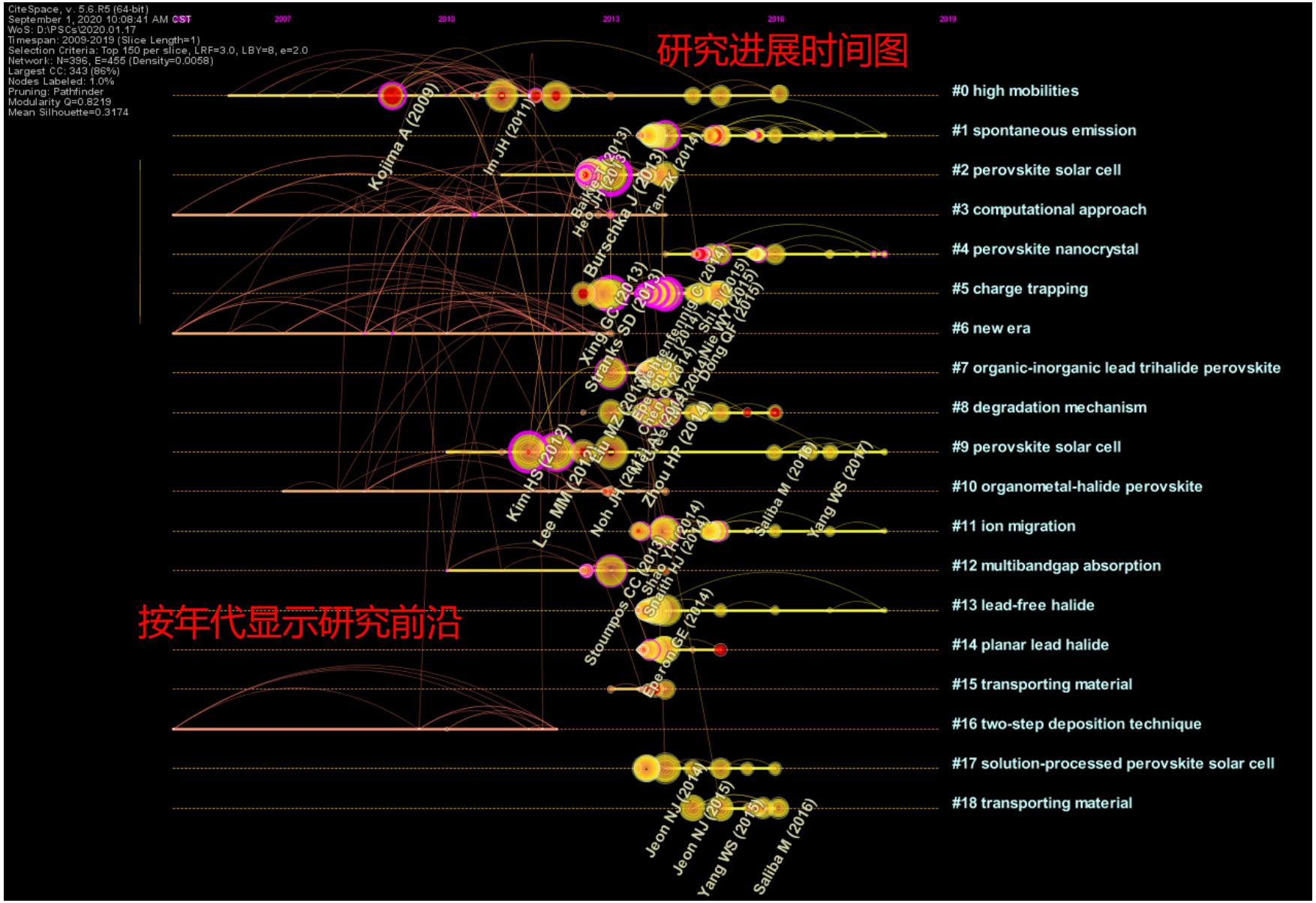
该窗口显示的是被引文献（反映的是知识基础），这些文献也是直接在图谱中显示的节点信息

Cited References | Keywords

Freq	Burst	BurstB...	BurstE...	Degree	Central...	Σ	PageR...	Label	Author	Year	Title	Source	Vol	Page	HalfLife	DOI	Cluster
1	0.00			29	0.00	1.00	0.00	Ma W (...	Ma W	2009	...	NANO ...	V9	P1699	2.5	10.102...	0
2	0.00			22	0.00	1.00	0.00	Mishra...	Mishra A	2009	...	ANGE...	V48	P2474	3.5	10.100...	0
1	0.00			18	0.00	1.00	0.00	Rogac...	Rogac...	2007	...	J PHY...	V111	P14628	3.5	10.102...	0
3	0.00			49	0.00	1.00	0.00	Kamat ...	Kamat ...	2008	...	J PHY...	V112	P18737	4.5	10.102...	0
1	0.00			18	0.00	1.00	0.00	Lee YL...	Lee YL	2009	...	ADV F...	V19	P604	1.5	10.100...	0
3	0.00			29	0.00	1.00	0.00	Takah...	Takah...	2011	...	DALTO...	V40	P5563	1.5	10.103...	0
5	3.43	2011	2013	80	0.01	1.03	0.00	Ruhle ...	Ruhle S	2010	...	CHEM...	V11	P2290	2.5	10.100...	0
2	0.00			35	0.00	1.00	0.00	Snaith ...	Snaith ...	2006	...	APPL ...	V89	P0	6.5	10.106...	0
7	4.81	2012	2013	87	0.01	1.03	0.00	Kojima...	Kojima...	2012	...	CHEM ...	V41	P397	0.5	10.124...	0
1	0.00			22	0.00	1.00	0.00	Jang S...	Jang SR	2011	...	ACS N...	V5	P8267	0.5	10.102...	0
24	15.12	2012	2014	149	0.01	1.16	0.00	Im JH (...	Im JH	2012	...	NANO...	V7	P0	1.5	10.118...	0
2	0.00			25	0.00	1.00	0.00	Kim M...	Kim MJ	2010	...	J PHY...	V114	P19849	1.5	10.102...	0
801	81.15	2013	2015	282	0.05	54.21	0.00	Etgar L...	Etgar L	2012	...	J AM C...	V134	P17396	3.5	10.102...	0
1277	32.84	2012	2014	342	0.17	154.55	0.00	Im JH (...	Im JH	2011	...	NANO...	V3	P4088	4.5	10.103...	0
1	0.00			18	0.00	1.00	0.00	Gonzal...	Gonzal...	2010	...	ACS N...	V4	P5783	0.5	10.102...	0
2	0.00			35	0.00	1.00	0.00	Abrusc...	Abrusc...	2011	...	ADV F...	V21	P2571	1.5	10.100...	0
1	0.00			29	0.00	1.00	0.00	Gao J...	Gao JB	2011	...	NANO ...	V11	P3263	0.5	10.102...	0
2	0.00			52	0.00	1.00	0.00	Im SH ...	Im SH	2011	...	ENER...	V4	P2799	1.5	10.103...	0
3	0.00			38	0.00	1.00	0.00	Li G (2...	Li G	2012	...	NAT P...	V6	P153	0.5	10.103...	0
2	0.00			29	0.00	1.00	0.00	Kamat ...	Kamat ...	2010	...	CHEM ...	V110	P6664	2.5	10.102...	0
2	0.00			29	0.00	1.00	0.00	Lin H (...	Lin H	2006	...	APPL ...	V68	P1	5.5	10.101...	0
1	0.00			29	0.00	1.00	0.00	Semo...	Semo...	2011	...	SCIEN...	V334	P1530	0.5	10.112...	0
2	0.00			37	0.00	1.00	0.00	Park J ...	Park J	2007	...	SOL E...	V91	P1749	4.5	10.101...	0
2	0.00			17	0.00	1.00	0.00	Mashiy...	Mashiy...	2007	...	FERR...	V348	P584	5.5	10.108...	0
639	119.25	2013	2015	246	0.02	6.11	0.00	Ball JM...	Ball JM	2013	...	ENER...	V6	P1739	1.5	10.103...	0
159	78.38	2012	2015	244	0.05	52.08	0.00	Chung...	Chung I	2012	...	NATURE	V485	P486	1.5	10.103...	0
4	0.00			29	0.00	1.00	0.00	Chen ...	Chen Z	2012	...	J LUMIN	V132	P345	0.5	10.101...	0
2	0.00			25	0.00	1.00	0.00	Papav...	Papav...	2012	...	J MATE...	V22	P8271	0.5	10.103...	0

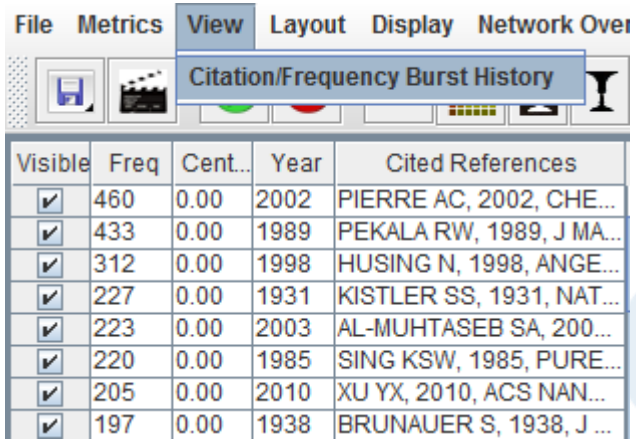
03 文献共被引分析

Timeline 呈现方式

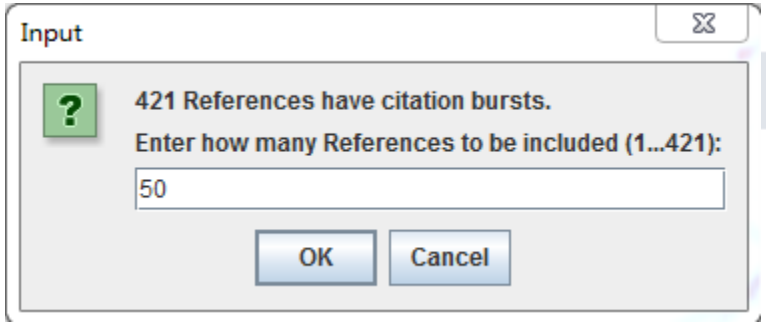


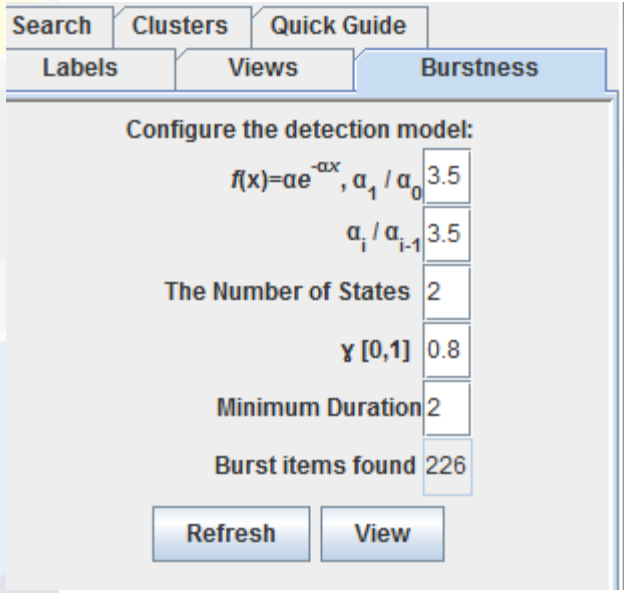
03 文献共被引分析

引用突变文献信息



Visible	Freq	Cent...	Year	Cited References
✔	460	0.00	2002	PIERRE AC, 2002, CHE...
✔	433	0.00	1989	PEKALA RW, 1989, J MA...
✔	312	0.00	1998	HUSING N, 1998, ANGE...
✔	227	0.00	1931	KISTLER SS, 1931, NAT...
✔	223	0.00	2003	AL-MUHTASEB SA, 200...
✔	220	0.00	1985	SING KSW, 1985, PURE...
✔	205	0.00	2010	XU YX, 2010, ACS NAN...
✔	197	0.00	1938	BRUNAUER S, 1938, J ...





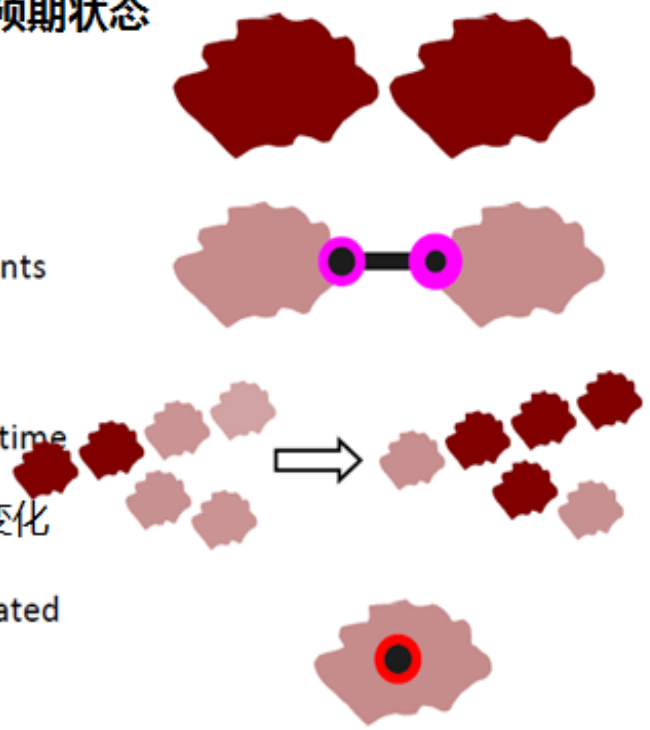
Top 120 References with the Strongest Citation Bursts

References	Year	Strength	Begin	End	2009 - 2019
Kojima A, 2009, J AM CHEM SOC, V131, P6050, DOI	2009	**310.6545**	2012	2017	
Ball JM, 2013, ENERG ENVIRON SCI, V6, P1739, DOI	2013	**106.2128**	2013	2015	
Park NG, 2013, J PHYS CHEM LETT, V4, P2423, DOI	2013	**85.4813**	2013	2015	
Mosconi E, 2013, J PHYS CHEM C, V117, P13902, DOI	2013	**84.9316**	2013	2016	
		1325	2014	2016	
		4749	2013	2016	
		3608	2014	2016	
		5864	2012	2016	
		2982	2013	2015	
		2925	2013	2015	
		1677	2013	2016	
		0032	2013	2015	
		3259	2014	2016	
		2543	2013	2015	
		.638	2017	2019	
		7249	2014	2015	
		6476	2017	2019	
		2.466	2014	2016	
		1796	2014	2015	
		7208	2013	2015	
		1667	2014	2015	
		6577	2013	2015	
Kim HS, 2014, J PHYS CHEM C, V118, P5615, DOI	2014	**57.3831**	2014	2016	
Ryu S, 2014, ENERG ENVIRON SCI, V7, P2614, DOI	2014	**57.0655**	2014	2016	
Bi DQ, 2013, RSC ADV, V3, P18762, DOI	2013	**56.7108**	2013	2015	
Seo J, 2014, ENERG ENVIRON SCI, V7, P2642, DOI	2014	**56.2275**	2015	2016	
Marchioro A, 2014, NAT PHOTONICS, V8, P250, DOI	2014	**56.1127**	2014	2016	
Sanchez RS, 2014, J PHYS CHEM LETT, V5, P2357, DOI	2014	**56.1127**	2014	2016	
Brenner TM, 2016, NAT REV MATER, V1, P0, DOI	2016	**55.4889**	2017	2019	
Even J, 2013, J PHYS CHEM LETT, V4, P2999, DOI	2013	**54.1635**	2013	2016	
Jeon NJ, 2013, J AM CHEM SOC, V135, P19087, DOI	2013	**54.1157**	2014	2015	

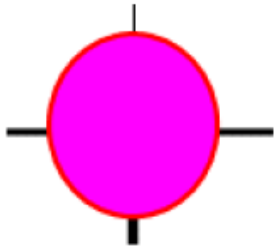
04 CiteSpace分析结果

Expected Patterns 预期状态

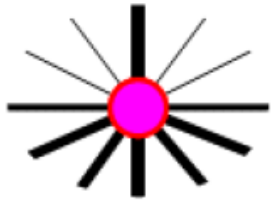
- Thematic grouping
  主题分组
- Intellectual turning points
  转折点
- Thematic change over time
  主题随着时间的推移变化
- Abrupt changes associated with triggers
  触发性的研究突变



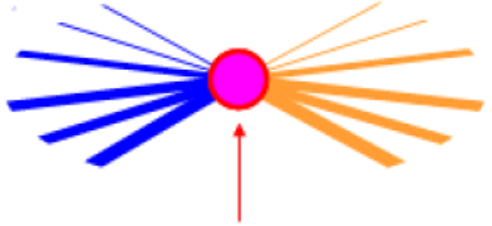
CiteSpace



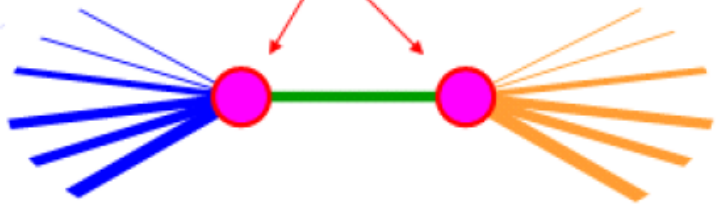
Landmark node
large radius



Hub node
large degree



Pivot node
exclusive joints of clusters or network patches



4 课件下载

https://lecture.xmu.edu.cn

提示：

也可通过图书馆主页获取

（主页-文档-讲座课件）

5 视频回放

- 哔哩哔哩网站（https://www.bilibili.com）搜索“厦大图书馆”，可学习往期课程

6 下一讲预告

AI时代的学术伦理

主讲：张妮妮

时间：11月28日（周四）19:00

地点：翔安校区德旺图书馆二楼A区信息素养教室

（同步直播）

7 有机会抽取图书馆文创纪念品！

厦门大学图书馆信息素养教育服务调研

扫一扫或长按识别二维码

谢谢大家！

主讲人：聂茶庚
邮箱：ncg@xmu.edu.cn