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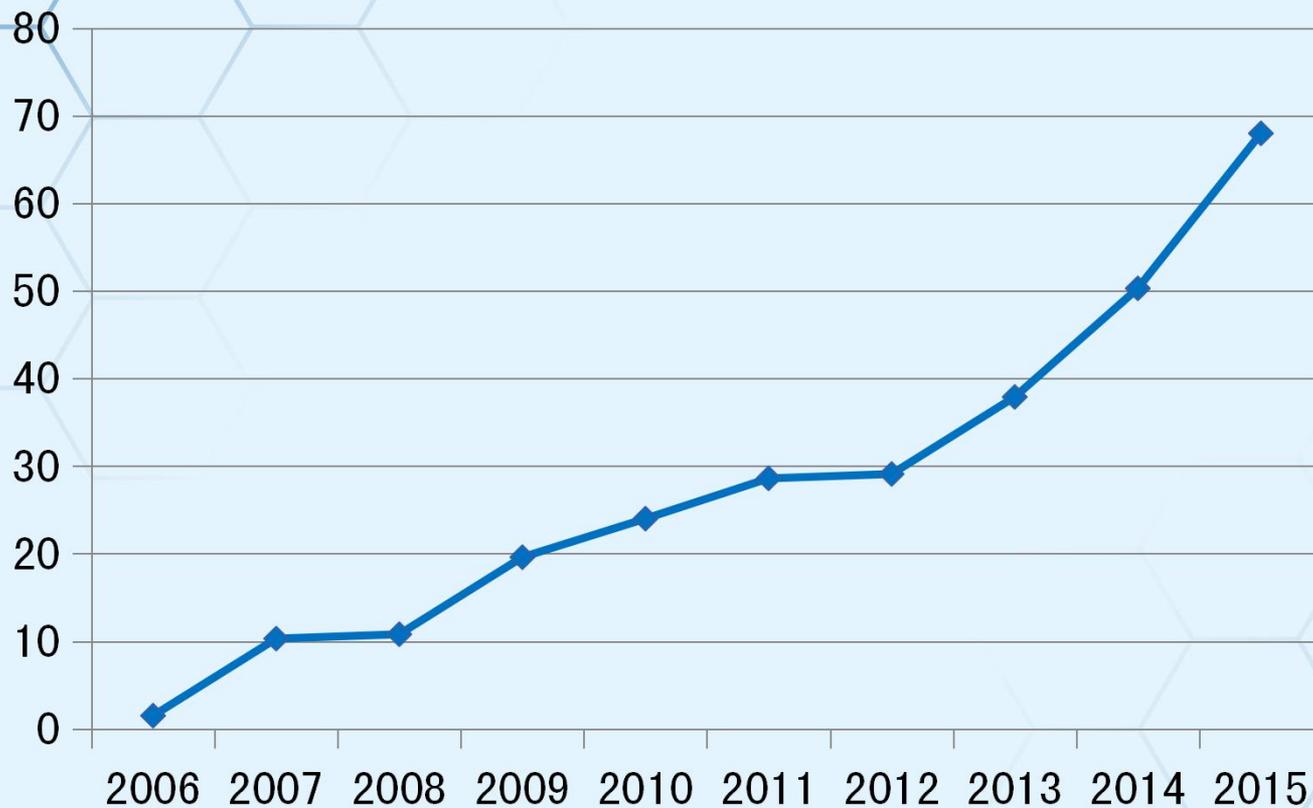
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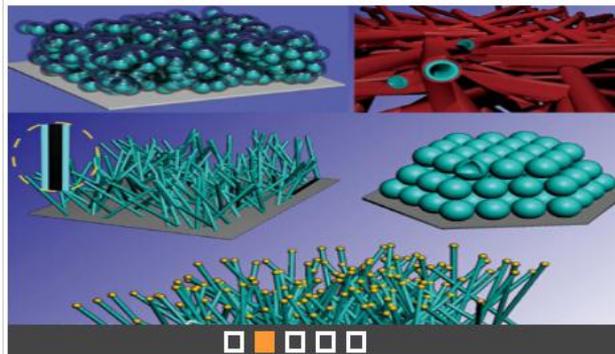
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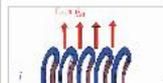
Front. Phys., 2014 Volume 9, Number 3

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Front. Phys., 2014 Vol.9 (4): 472-476



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Du Yan, Han Xue, Pu Rui, Xie Jiaxin, Zhang Yuwei, Cao Guangwen

Front. Med. 2014, 8 (2): 217-226. DOI: 10.1007/s11684-014-0326-2

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Advances in managing hepatocellular carcinoma

Marielle Reataza, David K. Imagawa

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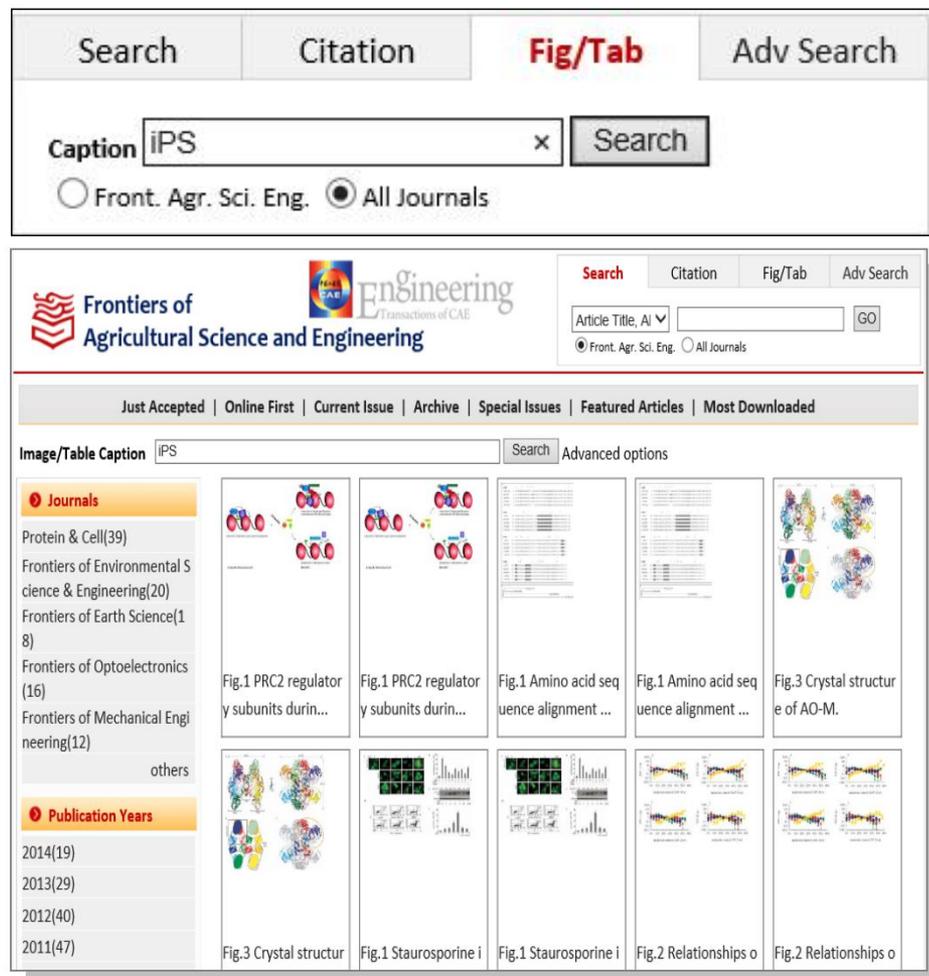
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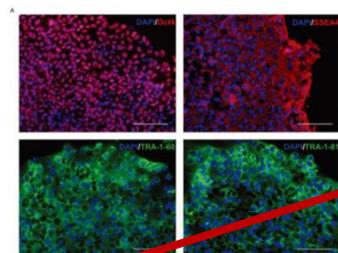
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A novel xeno-free and feeder-cell-free system for human pluripotent stem cell culture

Qihui Wang, Xiaoning Mou, Henghua Cao, Qingzhang Meng, Yanni Ma, Pengcheng Han, Junjie Jiang, Hao Zhang, Yue Ma

Prot Cell 2012, 3 (1): 51-59. DOI: 10.1007/s13238-012-2002-0

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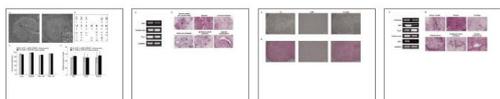
Fig.4 The hiPSCs generated express pluripotent markers and have a methylation status similar to that of hESCs. (A) Immunostaining of C1-OSN cells at passage 11 for the expression of specific markers Oct4, SSEA4, TRA-1-60 and TRA-1-81. Scale bar, 100 μ m. (B) QRT-PCR analysis of the expression levels of pluripotency factors in H7 hESCs (passage 56) and C1-OSN hiPSCs (passage 9). The expression levels of the transcripts indicated are given relative to GAPDH expression. Differences in the expression levels of H7 hESCs and C1-OSN hiPSCs were not significant ($p > 0.05$, $n = 3$). (C) Analysis of the methylation status of the Oct4 and Nanog promoters of H7 hESCs (passage 40), HDFs, and C1-OSN hiPSCs (passage 14), by bisulfite sequencing. Open circles indicate unmethylated CpGs, and filled circles indicate methylated CpGs.

Abstracts from the Article

To characterize the hiPSC line C1-OSN cells generated with our XF/FCF culture system, we examined their expression of undifferentiated hESC markers by immunostaining and quantitative RT-PCR. Results showed that C1-OSN cells were positive for alkaline phosphatase staining (Fig. 3B), and expressed the hESC-specific surface antigens SSEA-4, TRA-1-60 and TRA-1-81, and transcription factor Oct4 (Fig. 4A). Quantitative RT-PCR showed that C1-OSN cells expressed undifferentiated hESC-marker genes including Oct4, Sox2 and Nanog at levels equivalent to those of hESCs cultured in the MEF-CM/MG culture system (Fig. 4B).

In order to assess epigenetic reprogramming of C1-OSN, genomic DNA from C1-OSN cells, the parental HDFs and H7 hESCs was analyzed for DNA methylation status. The promoter regions of Oct4 and Nanog were subjected to bisulfite genomic sequencing. Results showed that, as was the case for undifferentiated hESCs, the promoter regions of Oct4 and Nanog in hiPSCs had greater degrees of demethylation than the parental fibroblast lines (Fig. 4C). These results are consistent with the occurrence of epigenetic remodeling during reprogramming by gene transduction (Yamanaka, 2008; Wang and Na, 2011). In addition, chromosomal G-banding analysis indicated that C1-OSN hiPSCs had a normal (46, XY) karyotype (Fig. 52).

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A novel xeno-free and feeder-cell-free system for human pluripotent stem cell culture

Qihui Wang, Xiaoning Mou, Henghua Cao, Qingzhang Meng, Yanni Ma, Pengcheng Han, Junjie Jiang, Hao Zhang, Yue Ma

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INTRODUCTION

RESULTS AND DISCUSSION

Establishment of a xeno-free and feeder-cell-free culture system for pluripotent stem cells
hESCs cultured in XF/FCF system retain their pluripotency

Figure1

Figure2

Reprogramming of human dermal fibroblasts to induced pluripotent stem cells using our XF/FCF culture system

Figure3

hiPSCs express hESC pluripotent markers and show evidence of nuclear reprogramming

Figure4

hiPSCs have multi-lineage differentiation potentials

Figure5

Verification that C1-OSN hiPSCs are reprogrammed from HDFs

MATERIALS AND METHODS

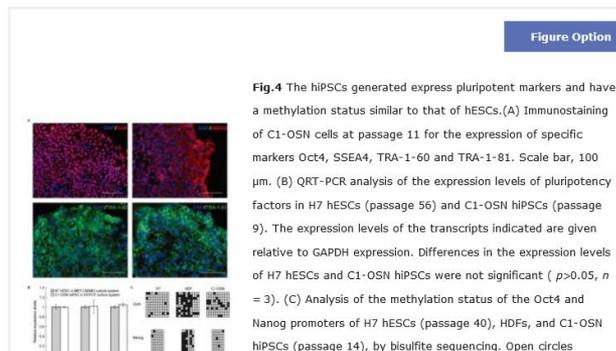


Fig.4 The hiPSCs generated express pluripotent markers and have a methylation status similar to that of hESCs. (A) Immunostaining of C1-OSN cells at passage 11 for the expression of specific markers Oct4, SSEA4, TRA-1-60 and TRA-1-81. Scale bar, 100 μ m. (B) QRT-PCR analysis of the expression levels of pluripotency factors in H7 hESCs (passage 56) and C1-OSN hiPSCs (passage 9). The expression levels of the transcripts indicated are given relative to GAPDH expression. Differences in the expression levels of H7 hESCs and C1-OSN hiPSCs were not significant ($p > 0.05$, $n = 3$). (C) Analysis of the methylation status of the Oct4 and Nanog promoters of H7 hESCs (passage 40), HDFs, and C1-OSN hiPSCs (passage 14), by bisulfite sequencing. Open circles

Figure Option



A novel xeno-free and feeder-cell-free system for human pluripotent stem cell culture

Qihui Wang 1, 2; Xiaoning Mou 1, 2; Henghua Cao 1; Qingzhang Meng 1; Yanni Ma 1; Pengcheng Han 1, 2; Junjie Jiang 1, 2; Hao Zhang 3; Yue Ma 1 ;

1. National Laboratory of Biomacromolecules, Institute of Biophysics, Chinese Academy of Sciences, Beijing 100101, China ; 2. Graduate School of the Chinese Academy of Sciences, Beijing 100080, China ; 3. Department of Surgery, Cardiovascular Institute, Fu Wai Heart Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037, China ;

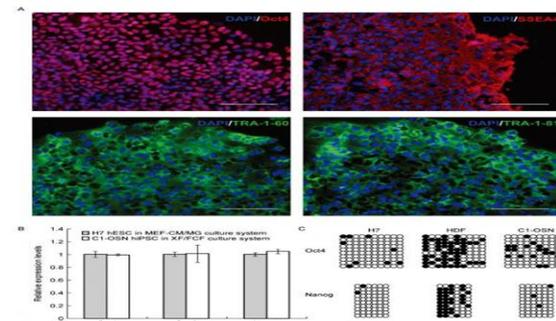


Fig.4 The hiPSCs generated express pluripotent markers and have a methylation status similar to that of hESCs. A Immunostaining of C1-OSN cells at passage 11 for the expression of specific markers Oct4, SSEA4, TRA-1-60 and TRA-1-81. Scale bar, 100 μ m. B QRT-PCR analysis of the expression levels of pluripotency factors in H7 hESCs

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Shuxiao WANG, Lei ZHANG, Long WANG, Qingru WU, Fengyang WAI
Front. Environ. Sci. Eng.. 2014, 8 (5): 631-649. DOI: 10.1007/s1178

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Shuxiao WANG^{1,2,*}, Lei ZHANG¹, Long WANG¹, Qingru WU¹, Fengyang WANG¹, Jiming HAO^{1,2}

1. State Key Joint Laboratory of Environmental Simulation and Pollution Control, School of Environment, Tsinghua University, Beijing 100084, China

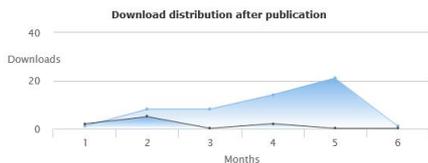
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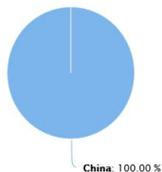
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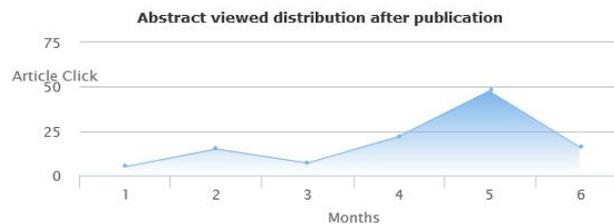
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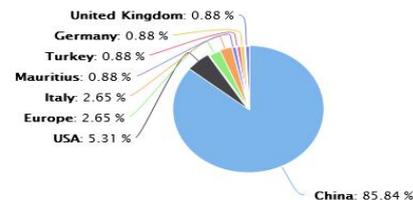
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A review of atmospheric mercury emissions, pollution and control in China

Shuxiao WANG^{1,2,*}, Lei ZHANG¹, Long WANG¹, Qingru WU¹, Fengyang WANG¹, Jiming HAO^{1,2}

1. State Key Joint Laboratory of Environmental Simulation and Pollution Control, School of Environment, Tsinghua University, Beijing 100084, China
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Abstract

Mercury, as a global pollutant, has significant impacts on the environment and human health. The current state of atmospheric mercury emissions, pollution and control in China is comprehensively reviewed in this paper. With about 500–800 t of anthropogenic mercury emissions, China contributes 25%–40% to the global mercury emissions. The dominant mercury emission sources in China are coal combustion, non-ferrous metal smelting, cement production and iron and steel production. The mercury emissions from natural sources in China are equivalent to the anthropogenic mercury emissions. The atmospheric mercury concentration in China is about 2–10 times the background level of North Hemisphere. The mercury deposition fluxes in remote areas in China are usually in the range of 10–50 $\mu\text{g}\cdot\text{m}^{-2}\cdot\text{yr}^{-1}$. To reduce mercury emissions, legislations have been enacted for power plants, non-ferrous metal smelters and waste incinerators. Currently mercury contained in the flue gas is mainly removed through existing air pollution control devices for sulfur dioxide, nitrogen oxides, and particles. Dedicated mercury control technologies are required in the future to further mitigate the mercury emissions in China.

Keywords atmospheric mercury emissions pollution control China

Corresponding Authors: Shuxiao WANG

Issue Date: 20 June 2014

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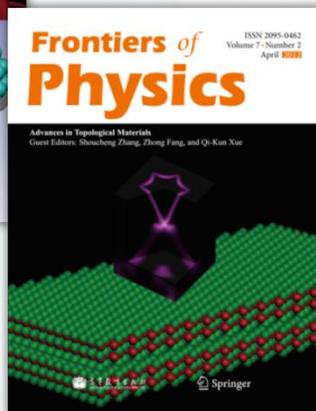
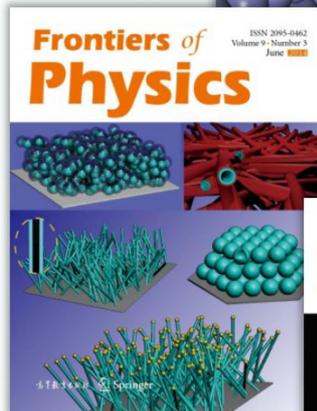
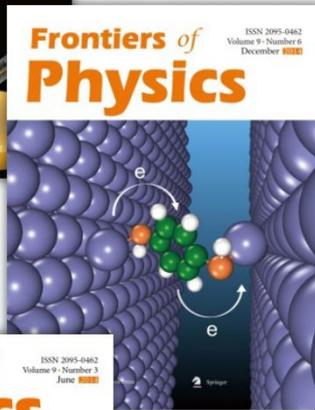
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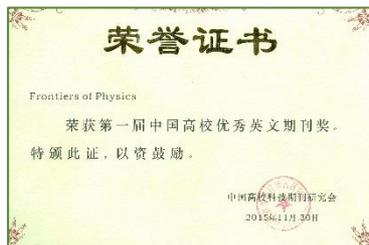
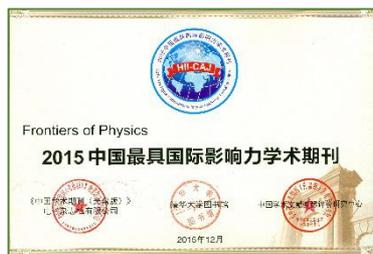


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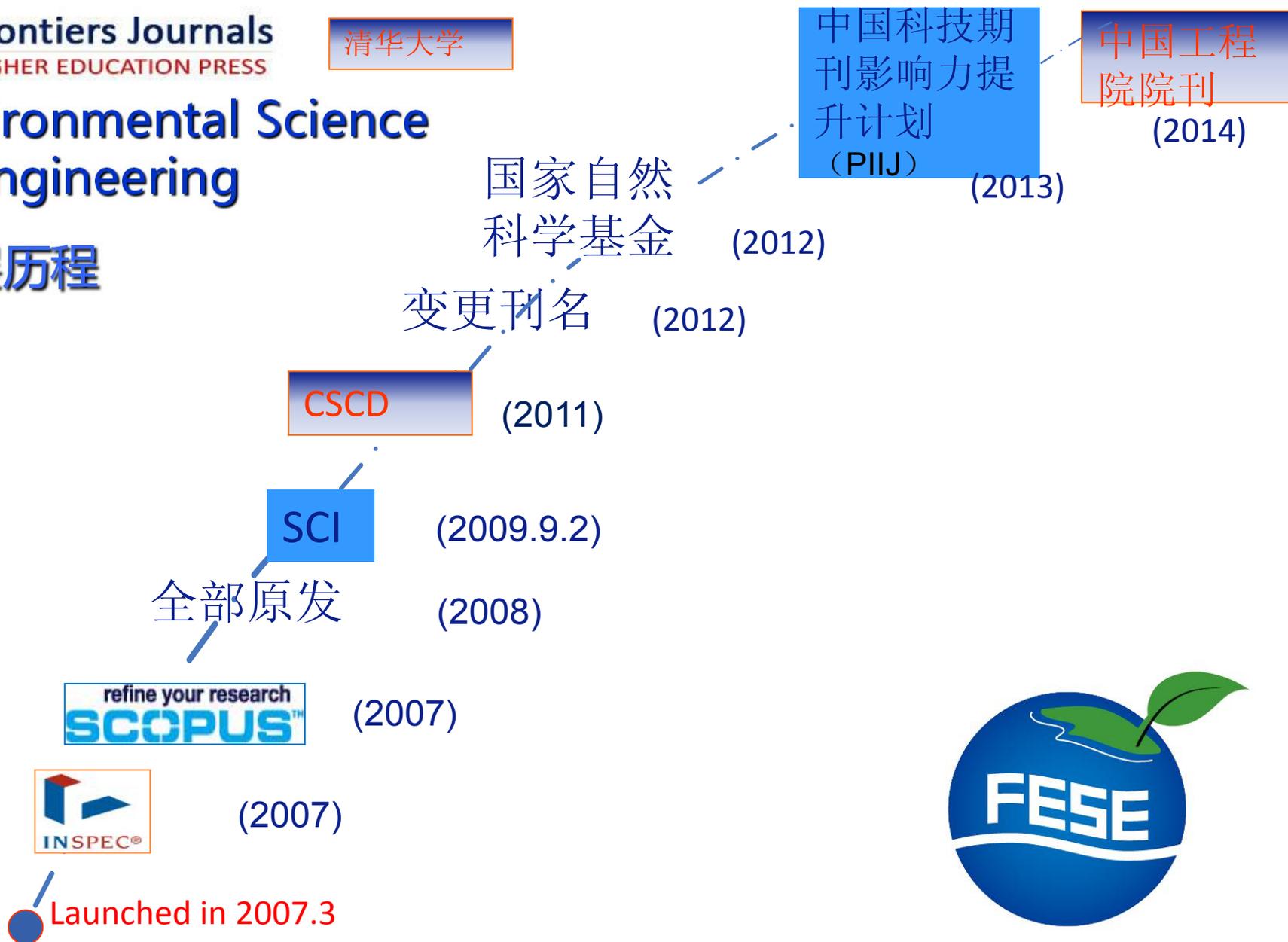


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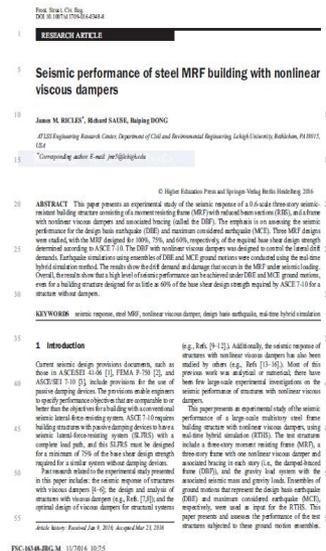
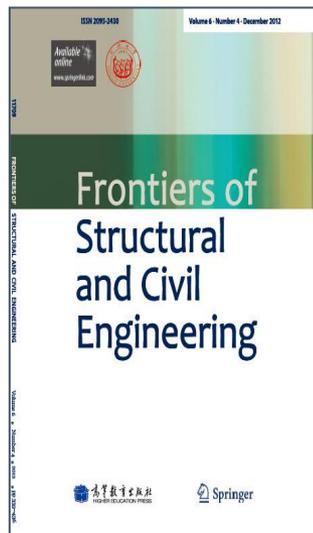
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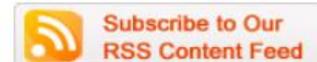
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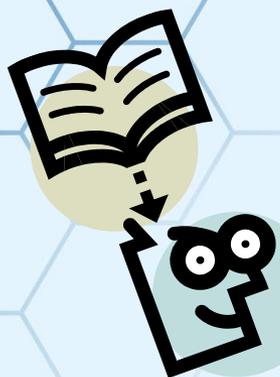
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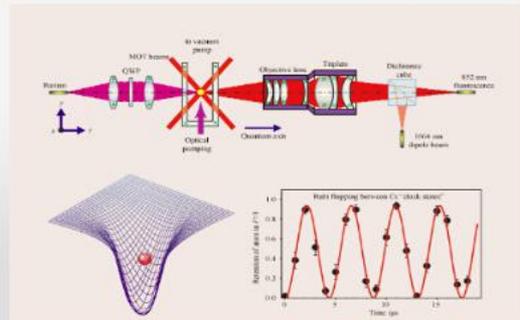
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An experimental approach for investigating many-body phenomena in Rydberg-interacting quantum systems

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Abstract

Recent developments in the study of ultracold Rydberg gases demand an advanced level of experimental sophistication, in which high atomic and optical densities must be combined with excellent control of external fields and sensitive Rydberg atom detection. We describe a tailored experimental system used to produce and study Rydberg-interacting atoms excited from dense ultracold atomic gases. The experiment has been optimized for fast duty cycles using a high flux cold atom source and a three beam optical dipole trap. The latter enables tuning of the atomic density and temperature over several orders of magnitude, all the way to the Bose–Einstein condensation transition. An electrode structure surrounding the atoms allows for precise control over electric fields and single-particle sensitive field ionization detection of Rydberg atoms. We review two experiments which highlight the influence of strong Rydberg–Rydberg interactions on different many-body systems. First, the Rydberg blockade effect is used to pre-structure an atomic gas prior to its spontaneous evolution into an ultracold plasma.

Second, hybrid states of photons and atoms called dark-state polaritons are studied. By looking at the statistical distribution of Rydberg excited atoms we reveal correlations between dark-state polaritons. These experiments will ultimately provide a deeper understanding of many-body phenomena in strongly-interacting regimes, including the study of strongly-coupled plasmas and interfaces between atoms and light at the quantum level.

Keywords ultracold Rydberg gases ultracold plasmas Bose–Einstein condensation atom–light interactions many-body interactions

Corresponding Authors: S. Whitlock

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