

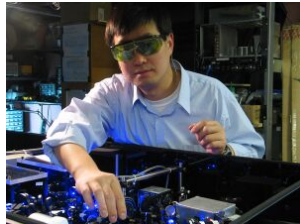
Jun Ye

Subjects: Others

Contributor: HandWiki Chen

Keywords: jila ; molecular

Basic Information



Name: Jun Ye
(Nov 1967–)

Birth Location:	Shanghai, China
Title:	Physicist
Affiliations:	National Institute of Standards and Technology JILA University of Colorado at Boulder
Honors:	Department of Commerce Gold Medal (2001, 2011, 2014) Arthur S. Flemming Award (2005) Carl Zeiss Research Award (2007) William F. Meggers Award (2007) I.I. Rabi Prize in Atomic, Molecular or Optical Physics (2007) Elected to the National Academy of Sciences (2011) Presidential Rank Award (2015)

1. Introduction

Jun Ye (Chinese: 叶军; pinyin: *Yè Jūn*; born 1967) is a Chinese-American physicist at JILA, National Institute of Standards and Technology, and the University of Colorado at Boulder, working primarily in the field of atomic, molecular and optical physics.

2. Education & Career

Ye was born in Shanghai, China, shortly after the beginning of the Cultural Revolution. His father was a naval officer and his mother an environmental scientist. He was primarily raised by his grandmother.^[1] Ye graduated with a bachelor's degree in physics from Shanghai Jiao Tong University in 1989. He then moved to the *United States* to commence graduate studies, completing a master's degree at the University of New Mexico under Marlan Scully in theoretical quantum optics in 1991. He also gained experience in experimental physics under John McInerney working on semiconductor lasers, and spent a summer at the Los Alamos National Laboratory.^[1]

Ye then went to the University of Colorado Boulder to begin a Ph.D. in physics. He was accepted as the last graduate student of eventual Nobel Prize laureate John L. Hall. His thesis was on high-resolution and high-sensitivity molecular spectroscopy, which he completed in 1997.^[2] He then moved to California Institute of Technology as a Milikan Postdoctoral Fellow, working under Jeff Kimble.^[3]

Ye moved back to Boulder and JILA as a JILA Associate Fellow and NIST physicist in 1999. John Hall donated most of his lab space to him.^[1] He was promoted to full Fellow in 2001 and has been there since, establishing a research program in AMO physics and precision measurement.^[4]

3. Research

Ye's research focuses on ultracold atoms, ultracold molecules, and laser-based precision measurement. His group has built record breaking very precise experimental optical atomic clocks. In 2017 Ye's JILA group reported an experimental 3D quantum gas strontium optical lattice clock in which strontium-87 atoms are packed into a tiny three-dimensional (3-D) cube at 1,000 times the density of previous one-dimensional (1-D) clocks, like the 2015 JILA clock. A synchronous clock comparison between two regions of the 3D lattice yielded a record level of synchronization of 5×10^{-19} in 1 hour of averaging time.^[5] The 3D quantum gas strontium optical lattice clock uses an unusual state of matter called a degenerate Fermi gas (a quantum gas for Fermi particles). The experimental data showed the 3D quantum gas clock achieved a precision of 3.5×10^{-19} in about two hours. In 2018 JILA reported that the 3D quantum gas clock reached a frequency precision of 2.5×10^{-19} over 6 hours.^{[6][7]}

Such clocks could potentially be used for research into variations in the Earth's gravitational field, searching for particles of dark matter, performing quantum simulations of many-body physics, and investigating the fundamental nature of light and matter.^{[8][9]} He also conducts research on strontium for experiments in quantum information science (collaborating with Mikhail Lukin, Ana Maria Rey, Peter Zoller, and others).^[10]

Ye's other research focuses include ultrastable lasers (which are essential for the mechanics of his atomic clock), frequency combs, and molecular spectroscopy.^[10] In 2012, his group successfully constructed the world's stablest laser.^[11] He pioneered the development of direct frequency comb spectroscopy, and also collaborates with Eric Cornell on an experiment aiming to measure the electric dipole moment of the electron using trapped ions.^[12]

4. Honors and Awards

Ye has received numerous awards in the field of science, particularly AMO physics. He was elected a Fellow of the American Physical Society^[13] and a Fellow of the Optical Society of America. He won the Adolph Lomb Medal of OSA in 1999 and the Arthur S. Flemming Award for outstanding federal employees in 2005,^[14] the Friedrich Wilhelm Bessel Research Award from Germany and the William F. Meggers Award of the Optical Society of America in 2006,^[15] and the Carl Zeiss Research Award^[16] and the I.I. Rabi Prize in AMO Physics from the APS in 2007.^[17] He has won three Gold Medals from the US Department of Commerce: for frequency combs (2001),^[18] ultracold molecules (2011),^[19] and atomic clocks (2014).^[20] In 2011 he was elected to the National Academy of Sciences,^[21] and also named a Frew Fellow from the Australian Academy of Science. In 2015, President Obama selected Jun Ye to receive a Presidential Rank Award for "sustained extraordinary accomplishment", citing his work advancing "the frontier of light-matter interaction and focusing on precision measurement, quantum physics and ultracold matter, optical frequency metrology, and ultrafast science."^[22] In 2017, Ye was elected as a foreign member of the Chinese Academy of Sciences.^[23]

He is one of the most highly-cited researchers in experimental atomic physics in the world, having a h-index of 85^[24] and being regularly named as a Thomson-Reuters (ISI) Highly Cited Researcher.^[25]

References

1. "Jun Ye | JILA Science". <https://jila.colorado.edu/faculty/jun-ye>. Retrieved 2015-11-25.
2. "John Hall's JILA Home Page". <https://jila.colorado.edu/hall/people.html#students>. Retrieved 2015-11-25.
3. "Quantum Optics: Past Members". http://quantumoptics.caltech.edu/past_members.html. Retrieved 2015-11-25.
4. "Ye Group". <http://jilawww.colorado.edu/yelabs/>. Retrieved 2015-11-25.
5. S. L. Campbell; R. B. Hutson; G. E. Marti; A. Goban; N. Darkwah Oppong; R. L. McNally; L. Sonderhouse; W. Zhang et al. (6 October 2017). "A Fermi-degenerate three-dimensional optical lattice clock". *Science* 358 (6359): 90–94. doi:10.1126/science.aam5538. https://jila.colorado.edu/yelabs/sites/default/files/uploads/Fermi_degenerate_3d_clock_Science%202017.pdf. Retrieved 29 March 2017.
6. G. Edward Marti; Ross B. Hutson; Akihisa Goban; Sara L. Campbell; Nicola Poli; Jun Ye (5 March 2018). "Imaging Optical Frequencies with 100 μ Hz Precision and 1.1 μ m Resolution". *Physical Review Letters* 120 (10): 1–6. doi:10.1103/PhysRevLett.120.103201. <https://jila.colorado.edu/yelabs/sites/default/files/uploads/PRL.120.103201.ClockImaging.pdf>. Retrieved 30 March 2017.

7. Laura Ost (5 March 2018). "JILA Team Invents New Way to 'See' the Quantum World". JILA. <https://www.nist.gov/news-events/news/2018/03/jila-team-invents-new-way-see-quantum-world>. Retrieved 30 March 2017.
8. "About Time | JILA Science". <http://jila.colorado.edu/news-highlights/about-time>. Retrieved 2015-11-25.
9. "The most accurate clock ever built only loses one second every 15 billion years". <https://www.theverge.com/2015/4/22/8466681/most-accurate-atomic-clock-optical-lattice-strontium>. Retrieved 2015-11-26.
10. "Research | Ye Group". <http://jilawww.colorado.edu/yelabs/research/research>. Retrieved 2015-11-25.
11. NIST, US Department of Commerce,. "The World's Most Stable Laser" (in EN-US). <https://www.nist.gov/pml/div689/new-ultrastable-laser.cfm>. Retrieved 2015-12-20.
12. "Cornell Group - Contact Information". http://jila.colorado.edu/bec/CornellGroup/edm_ion_trap/. Retrieved 2015-11-25.
13. "APS Fellow Archive". http://www.aps.org/programs/honors/fellowships/archive-all.cfm?initial=Y&year=2015&unit_id=&institution=. Retrieved 2015-11-25.
14. "GW News Center". http://www.gwu.edu/~media/pressrelease.cfm?event_id=5100. Retrieved 2015-11-25.
15. "William F. Meggers Award - Awards - OSA.org | The Optical Society". http://www.osa.org/en-us/awards_and_grants/awards/award_description/meggersaward/. Retrieved 2015-11-25.
16. "Carl Zeiss Research Award". http://www.zeiss.com/corporate/en_de/innovation-and-technology/research-award-winners.html#2007. Retrieved 2015-11-25.
17. "Prize Recipient". http://www.aps.org/programs/honors/prizes/prizerecipient.cfm?last_nm=Ye&first_nm=Jun&year=2007. Retrieved 2015-11-25.
18. "Fifty-Third Annual Honor Awards Program". http://hr.commerce.gov/s/groups/public/@doc/@cfoasa/@ohrm/documents/content/prod01_001297.pdf. Retrieved 25 November 2015.
19. NIST, US Department of Commerce,. "National Institute of Standards and Technology Recognizes Staff" (in EN-US). https://www.nist.gov/public_affairs/releases/awards2011.cfm. Retrieved 2015-11-25.
20. NIST, US Department of Commerce,. "National Institute of Standards and Technology Presents 2014 Awards to Outstanding Employees" (in EN-US). <https://www.nist.gov/director/2014-annual-awards.cfm>. Retrieved 2015-11-25.
21. NIST, US Department of Commerce,. "NIST/JILA Physicist Jun Ye Elected to National Academy of Sciences" (in EN-US). <https://www.nist.gov/pml/div689/ye-051011.cfm>. Retrieved 2015-11-25.
22. "Jun Ye Selected for 2015 Presidential Rank Award | JILA Science". <http://jilawww.colorado.edu/news/jun-ye-selected-2015-presidential-rank>. Retrieved 2015-12-20.
23. "关于公布2017年中国科学院院士增选当选院士名单的公告" (in zh). Chinese Academy of Sciences. 2017-11-28. <http://www.casad.ac.cn/doc/17503.html>.
24. "Jun Ye - Google Scholar Citations". <https://scholar.google.com/citations?user=eifJXIEAAAAJ&hl=en&oi=ao>. Retrieved 2015-11-25.
25. "Home | Highly Cited Researchers" (in en-US). <http://highlycited.com/>. Retrieved 2015-11-25.

Retrieved from <https://encyclopedia.pub/entry/history/show/82105>