PML’s Joint Institutes

PML has two Joint Institutes:

• JILA founded in 1962 as the “Joint Institute for Laboratory Astrophysics” – it was the first government/university partnership

• Joint Quantum Institute (JQI) founded in 2006 – modelled in part on JILA

In 2014, PML together with ITL extended our relationship with UMD by establishing the Joint Center for Quantum Information in Computer Science (QuICS)
JILA

- Started with a focus on laboratory astrophysics
- Today JILA is a leading research center including:
  - Astrophysics
  - Atomic and Molecular Physics
  - Biophysics
  - Chemical Physics
  - Laser Physics
  - Nanoscience
  - Precision Measurement
  - Quantum Information
- Currently ~300 people, including students, postdocs, technicians, administrators, and scientists

28 JILA Fellows (10 NIST, 18 CU):
- NIST Fellows hold Adjoint CU Faculty Appointments
- PML’s Quantum Physics Division is the NIST part of JILA
Joint Quantum Institute: JQI

- Joint institute of NIST and the University of Maryland with the participation and support of NSA
- 30 JQI Fellows (13 NIST, 16 UMD, and 1 LPS)
  - NIST JQI Fellows hold Adjunct UMD faculty appointments
- 180 people, and still growing
- Today the JQI is a leading and the largest center for quantum science in the U.S.
- Research activities includes:
  - Cold quantum matter (AMO Physics)
  - Quantum matter and materials (Condensed Matter Physics)
  - Quantum Information

Labs of the JQI
College Park, Maryland
Joint Center for Quantum Information and Computer Science

- Joint institute of NIST and the University of Maryland with the participation and support of NSA
- 13 QuICS Fellows (6 NIST, 6 UMD, and 1 NSA)
  - NIST JQI Fellows hold Adjoint UMD faculty appointments
  - 5 Fellows (4 NIST and 1 UMD) are joint with the JQI
- 27 students, 13 postdocs, and visitors
- Already recognized as a leading center for quantum information in computer science:
  - How does quantum mechanics inform the theory of computation and communication?
  - What insight does computer science shed on quantum computing?
  - What are the consequences of quantum information theory for fundamental physics?
  - How can theoretical advances in computation and communication be applied?
All Articles:
8089 articles with an h-index=228
364,960 citations, avg. 45/article
2016: 258 articles 17849 citations
2017: 205 articles 18098 citations

QIS articles:
685 articles with an h-index=90
36546 citations, avg. 53/article
2016: 53 articles 3548 citations
2017: 43 articles 3585 citations
All Articles since 2007:
- 2546 articles with an h-index=112
- 65,606 citations, avg. 26/article
- 2016: 258 articles 9410 citations
- 2017: 205 articles 9914 citations

QIS articles:
- 445 articles with an h-index=66
- 18557 citations, avg. 42/article
- 2016: 53 articles 3548 citations
- 2017: 43 articles 3585 citations
Publications of JQI

All Articles since 2007:
1733 articles with an h-index=100
50833 citations, avg. 29/article
2016: 184 articles 8126 citations
2017: 216 articles 8562 citations

QIS articles:
662 articles with an h-index=72
26931 citations, avg. 41/article
2016: 73 articles 4324 citations
2017: 94 articles 4643 citations

Times Cited per Year: Web of Science Oct 12, 2018

Publications per Year (8089 total): Web of Science
Conclusions

• Both JILA and the JQI are world class and prolific
• According to US News and World Report of US Graduate Physics Programs:
  - CU ranks 2\textsuperscript{nd} in AMO, 6\textsuperscript{th} in Quantum, and 14\textsuperscript{th} in all of Physics
  - UMD ranks 6\textsuperscript{th} in AMO, 6\textsuperscript{th} in Quantum, 11\textsuperscript{th} in CM, and 14\textsuperscript{th} in all of Physics
• Both JILA and the JQI have an NSF Physics Frontier Center: Only 11 of these prestigious center exist
• Both produce highly trained students and postdocs
• JILA has a long history of spin-off of technology companies while JQI only has IonQ
QUESTIONS?