



## Formation of MPSAC Subcommittee

C. Denise Caldwell, DD/PHY

Purpose: Assess how well the Physics Frontiers Centers program is addressing its stated goals

Presented to MPSAC, November 2017



# Physics Frontiers Centers

Supports university-based centers and institutes where the collective efforts of a large group of individuals can enable transformational advances at the intellectual frontiers of physics

Supports research in all subfields of physics within the purview of the Physics Division; also supports research at the interface between these areas and related fields, e.g. condensed matter physics, biology, astronomy, computer science.

The successful PFC-funded entity will demonstrate:

- (1) potential for a profound advance in physics;
- (2) creative, substantive activities aimed at enhancing education, diversity, and public outreach;
- (3) potential for broader impacts, e.g. to other scientific fields and to society;
- (4) synergy or value-added rationale that justifies a center- or institute-like approach



# Physics Frontiers Centers

Open competitions are held every three years; FY17 just completed

No automatic sunset clause. Existing centers may compete in the open competition and be renewed as long as they survive the competition. (Not an NSF center according to SMART definition)

Funded for five years with a potential for a one-year extension, conditional on a successful site visit review, to allow the opportunity to compete during the triennial open competition without disruption.

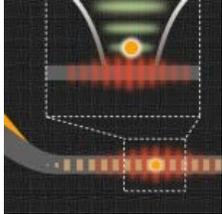
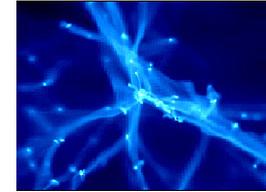
Typical competition includes 50-60 pre-proposals; 15-20 full proposals (by invitation only); 10-12 invitees to reverse site visit

Since inception in FY 2001, 15 centers/institutes have been funded; six have been (or are being) phased out through the triennial competition; currently fund nine centers/institutes plus two in phase-out stage. New centers have been started in each open competition.



# Physics Frontiers Centers

Kavli Institute for Cosmological Physics – Chicago - Turner  
(With GEO/PLR)



Center for Ultracold Atoms – MIT/Harvard – Ketterle  
(With CISE/CCF)

PFC@JILA – Colorado – Cornell



Kavli Institute for Theoretical Physics – UCSB – Bildsten  
(Jointly between MPS/PHY/AST/DMR and BIO/MCB)

Center for Theoretical Biological Physics – Rice – Onuchic  
(Jointly between MPS/PHY/CHE/DMR and BIO/MCB)

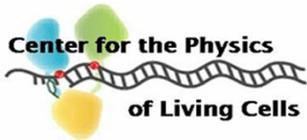
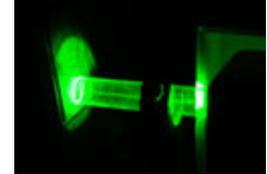


Joint Institute for Nuclear Astrophysics – Michigan State - Schatz



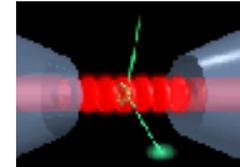
## Physics Frontiers Centers (Cont'd)

PFC@Joint Quantum Institute – Maryland/NIST  
–  
Phillips



Center for the Physics of Living Cells – U Illinois – Chemla  
(Jointly between MPS/PHY/CHE and BIO/MCB)

Institute for Quantum Information and Matter – Caltech  
- Preskill (With CISE/CCF)



North American Nanohertz Observatory for Gravitational Waves –  
U Wisconsin Milwaukee – Siemens (MPS/PHY/AST)

Center for the Physics of Biological Function - CUNY/Princeton – Bialek  
(Jointly between MPS/PHY/CHE and BIO/MCB/IOS)



# Physics Frontiers Centers

Support kept at <10% of PHY budget; currently ~7%

Considerable Co-Funding from other Divisions in NSF;  
OMA; MPS/DMR, AST, CHE; BIO/MCB, IOS; CISE/CCF; GEO/PLR

FY	Total \$	PHY \$	Other
12	26.67	22.12	4.55
13	25.10	20.85	4.25
14	25.51	21.33	4.18
15	28.01	21.33	6.68
16	25.99	21.33	4.66
17	30.31	21.33	8.98

Especially appreciate co-funds as others have no comparable program;  
Funds from individual programs; All PDs involved at all stages of competition.



# PFC Reviews

Site Visit Reviews with External Panel every Two Years  
Focus on Four Main Goals of Center

Special Panel in Triennial CoV to Assess Selection Process

Positive reviews in 2006, 2009, 2012, 2015 PHY CoV reports

2015 CoV Recommendation

“We believe that the Center program would benefit from a dedicated comprehensive review by a high-level body with the time, access and expertise to evaluate the PFC program. One would like independent confirmation that the PFCs add value in a way that individual investigator grants do not.”



## Ask MPSAC To Appoint Subcommittee

The Subcommittee will be asked to assess how well the PFC program is addressing its stated goal of

“fostering major breakthroughs at the intellectual frontiers of physics by providing needed resources such as combinations of talents, skills, disciplines, and/or specialized infrastructure, not usually available to individual investigators or small groups, in an environment in which the collective efforts of the larger group can be shown to be seminal to promoting significant progress in the science and the education of students.”