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The American Physical Society
Advancing and Diffusing the Knowledge of Physics

8 October 2016
College Park, MD
• Founded in 1899
• Past presidents: Michelson, Millikan, Lyman, Compton, Oppenheimer, Fermi, Bethe, ...
• 53,000 members
• 29 Scientific units (Condensed Matter, Climate, Physics Education, …)
• 7 Forums (Graduate student affairs, Education, Outreach, …)
• 10 Sections (Mid-Atlantic)
• Current President: Homer Neal
• CEO: Kate Kirby
Observation of Gravitational Waves from a Binary Black Hole Merger

B. P. Abbott et al.*
(LIGO Scientific Collaboration and Virgo Collaboration)
(Received 21 January 2016; published 11 February 2016)

On September 14, 2015 at 09:50:45 UTC the two detectors of the Laser Interferometer Gravitational-Wave Observatory simultaneously observed a transient gravitational-wave signal. The signal sweeps upwards in frequency from 35 to 250 Hz with a peak gravitational-wave strain of $1.0 \times 10^{-21}$. It matches the waveform predicted by general relativity for the inspiral and merger of a pair of black holes and the ringdown of the resulting single black hole. The signal was observed with a matched-filter signal-to-noise ratio of 24 and a false alarm rate estimated to be less than 1 event per 203,000 years, equivalent to a significance greater than 5.1$\sigma$. The source lies at a luminosity distance of $410^{+160}_{-180}$ Mpc corresponding to a redshift $z = 0.09^{+0.03}_{-0.04}$. In the source frame, the initial black hole masses are $36^{+4}_{-4} M_{\odot}$ and $29^{+4}_{-3} M_{\odot}$, and the final black hole mass is $62^{+5}_{-4} M_{\odot}$, with $3.0^{+0.5}_{-0.3} M_{\odot} c^2$ radiated in gravitational waves. All uncertainties define 90% credible intervals. These observations demonstrate the existence of binary stellar-mass black hole systems. This is the first direct detection of gravitational waves and the first observation of a binary black hole merger.

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I. INTRODUCTION

In 1916, the year after the final formulation of the field equations of general relativity, Albert Einstein predicted the existence of gravitational waves. He found that

The discovery of the binary pulsar system PSR B1913+16 by Hulse and Taylor [20] and subsequent observations of its energy loss by Taylor and Weisberg [21] demonstrated the existence of gravitational waves. This discovery, along with emerging astrophysical understanding [22],...
Conference for Undergraduate Underrepresented Minorities in Physics

CU^2MiP
October 7th-9th, 2016
University of Maryland & National Institute of Standards and Technology
8.2 JOINT DIVERSITY STATEMENT
(Adopted by Council on November 16, 2008)

To ensure a productive future for science and technology in the United States, we must make physics more inclusive. The health of physics requires talent from the broadest demographic pool. Underrepresented groups constitute a largely untapped intellectual resource and a growing segment of the U.S. population.

Therefore, we charge our membership with increasing the numbers of underrepresented minorities in physics in the pipeline and in all professional ranks, with becoming aware of barriers to implementing this change, and with taking an active role in organizational and institutional efforts to bring about such change. We call upon legislators, administrators, and managers at all levels to enact policies and promote budgets that will foster greater diversity in physics. We call upon employers to pursue recruitment, retention, and promotion of underrepresented minority physicists at all ranks and to create a work environment that encourages inclusion. We call upon the physics community as a whole to work collectively to bring greater diversity wherever physicists are educated or employed.
APS Diversity Efforts

• APS Bridge Program
• National Mentoring Community
• Conferences for Undergraduate Women in Physics
• Committees: Committee on Minorities, Committee on the Status of Women in Physics
• Forming: Forum on Diversity and Inclusion (2017)
• Professional Skills Development Workshops for Women in Physics
• APS Statements/Policies: Diversity (2008); Women (2015); Code of Conduct at Meetings (2015)
• Report: LGBT Climate in Physics
2017 SITES

- Harvard
- Montana State
- Princeton
- Rice
- UCLA
- University of Colorado
- University of Wisconsin
- Virginia Tech
- Wayne State
- McMaster (Ontario)

aps.org/cuwip
• Increase the number of underrepresented ethnic/racial minority students who complete Bachelor’s degrees in physics
• Support mentoring relationships between undergraduate physics students and local physics mentors
• 100+ mentors, mentees
• Support for travel to National Mentoring Conference
• Emergency Aid Fund (2017)
• CU²MiPs in 2017?
URM Physics PhDs to Minority Population

Only ~30 students!

Sources: IPEDS Completion survey by race, US Census

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APS Bridge Program: Key Features

- **Recruit** through graduate programs (unaccepted students), undergrad programs (promising, but uncompetitive students)
- **Establish** Bridge Sites (6):
  - Year 1: Advanced undergraduate or grad courses, introduction to grad-level research, active mentoring, progress monitoring, social integration into grad school *(Project funds)*
  - Year 2: Take 1st year grad courses, apply to PhD program, research underway *(Department funds)*
- **Place** additional students (at Partnership Institutions):
  - 44 graduate programs looked at “other” applications (2016), recruited additional students; No direct support, some travel
  - “COM approved” Partnership Institutions; national recognition of program
- **Monitor** student/site progress
- **Research**
- **Disseminate / Advocate**
Bridge Program Achievements

- 23% Female (All: 20%)
- 93% URM (All: 6%)
  - 64% Hispanic
  - 24% African American
  - 5% Native
- 88% Retention (All: 60%)

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