Accurate Waveforms for Extreme/Intermediate-mass-ratio-inspirals (AWE)

Fact Sheet

Project Information

AWE

Grant agreement ID: 627781

Project closed

Start date
1 October 2014

End date
30 September 2017

Funded under
Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost
€ 263 058,30

EU contribution
€ 263 058,30

Coordinated by
UNIVERSITY COLLEGE DUBLIN, NATIONAL UNIVERSITY OF IRELAND, DUBLIN
Ireland

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Objective

"The age of gravitational wave astronomy will soon be upon us. Initially the most likely sources to be detected by ground-based detectors will be compact binary systems. This project proposes to deepen our understanding of such two-body systems by computing accurate gravitational waveforms from extreme- and intermediate-mass-ratio systems. The latter is expected to be directly observed in the LIGO and VIRGO detectors and having access to accurate waveforms will allow us to perform precision science with the incoming signals. The detailed information revealed by these signals will allow us to test gravity in the strongest-field regimes and provide rich insight into some of the most mysterious objects in the universe, black holes.

The approach taken will be to extend existing perturbation theory techniques, with a particular emphasis on using the results to compute the inspiral of a compact object into a black hole. Recent results have shown that the perturbation theory approach is valid over a much wider range of mass-ratios than previously suspected and, as such, perturbation theory results are already having an impact on studies on a wide class of systems within the two-body problem. By making connections with post-Newtonian, numerical relativity and effective-one-body theory perturbation theory has taken centre stage in binary system modeling recently. This project will further these synergies and provide a deep understanding of large-mass-ratio binary systems.

Novel approaches to computing inspirals via the so-called `self-force' approach will be developed. In particular, insight coming from University College Dublin via their Green function approach and the deep knowledge at Massachusetts Institute of Technology of the first-order self-force problem will facilitate the development of new methods for computing gravitational wave emission from the systems of physical interest."

Fields of science (EuroSciVoc)

natural sciences > physical sciences > astronomy > observational astronomy > **gravitational waves**

natural sciences > physical sciences > astronomy > astrophysics > **black holes**

Programme(s)

FP7-PEOPLE - Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Topic(s)

FP7-PEOPLE-2013-IOF - Marie Curie Action: "International Outgoing Fellowships for Career Development"

Call for proposal

FP7-PEOPLE-2013-IOF
See other projects for this call

Funding Scheme

MC-IOF - International Outgoing Fellowships (IOF)

Coordinator

UNIVERSITY COLLEGE DUBLIN, NATIONAL UNIVERSITY OF IRELAND, DUBLIN

EU contribution

€ 263 058,30

Total cost

No data

Address

BELFIELD
4 Dublin
Ireland

Region

Ireland > Eastern and Midland > Dublin

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Last update: 12 March 2015

Permalink: https://cordis.europa.eu/project/id/627781