Playing With Gravitational Wave Detectors

Exhibits and Apps for Public Engagement with Gravitational Wave Research

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We have developed a range of tools and activities that can be used for both long-term and wide-reaching public engagement with gravitational wave research. Out exhibits and apps, primarily developed at The Institute of Gravitational Wave Astronomy at the University of Birmingham, are designed to entertain and educate the public both when guided by an expert and as free-standing activities.

Since 2009, we have produced a series of apps and games related to gravitational wave astronomy and detectors. Titles such as *Stretch and Squash* and *Space-Time Quest* are familiar to many in the gravitational wave community, and have been used extensively by both our colleagues and others. Since 2013, we have worked to upgrade and expand these using Unity3D, enabling use across all mobile devices. Our apps are now available on the major app stores and via the *LaserLabs* website [1]. They have been downloaded over 15000 times by users across the globe. We are now developing our next release, Black Hole Master, and are particularly working to boost active user engagement with our apps and with us as both scientists and developers.

In anticipation of the increased media coverage and public interest in gravitational wave astronomy brought about by the first detections in 2015, we worked with Thinktank, Birmingham's Science Museum to develop an exhibit demonstrating the core technologies that have enabled gravitational wave astronomy [2]. The exhibit is centred around a high-quality Michelson interferometer, and incorporates electronics and software, developed by members of the group, to create an interactive model detector. The configuration can be adapted for use both in the presence of experts, e.g. at a science fair, and as a stand-alone piece in a museum. Users can push buttons to send signals to the detector, watch videos of group members giving their take on the science and excitement of the first detections, take a quiz to see what they've learnt, and more. Our Michelson exhibit has been installed at the Thinktank since 2016, and was also featured as part of the UK gravitational wave community's "Listening to Einstein's Universe" stand at the 2017 Royal Society Summer Exhibition. We are currently creating a website including a complete build guide for others to replicate our work.

In this talk, we will provide an overview of the activities we have developed, the development process, and how others can use our designs and resources.

References

[1] `www.laserlabs.org`

[2] `https://www.birmingham.ac.uk/news/latest/2016/07/Birmingham%27s-role-in-gravitational-wave-detection-celebrated-in-Thinktank-exhibit.aspx`