Contribution ID: **28** Type: **not specified**

Rapid response gravitational wave follow-up with the PIRATE robotic telescope

Friday, 23 March 2018 10:10 (20 minutes)

In the last two years since LIGO discovered the first gravitational waves, the field of gravitational wave astronomy has advanced rapidly. In the last observing run (O2) LIGO detected two more binary black hole mergers and with the help of Virgo, was also able to detect gravitational waves from a binary neutron star merger. This event was a landmark discovery because in addition to gravitational waves there was an electromagnetic (EM) counterpart discovered less than 12 hours later, which turned out to be the first in ˜250 EM observations that followed, making this the most widely observed astronomical event in history. The large majority of these observations were performed by ground based optical telescopes, and it was these telescopes that have performed similar tasks in every other LIGO alert in O2; by searching the night sky for an optical counterpart to the gravitational wave signals. The PIRATE robotic telescope, owned by The Open University but located in Tenerife, took part in some of these follow-up searches and was able to utilize its robotic nature to perform rapid follow-up observations as soon as an alert was received.

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