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Welcome to the Dome - Three surprising things a Robot Telescope can do

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Small robot telescopes occupy a particular niche in the astronomy ecosystem by virtue of their autonomous scheduling capabilities, rapid response times and flexible operations. These characteristics offer a wealth of use cases, three examples of which are explored in this talk.

Located at Boyden Observatory, Watcher is a robotic telescope owned by University College Dublin, developed and operated in collaboration with University of the Free State.

Gamma-ray bursts are the most luminous electromagnetic events in the universe, the signal of the collapse of distant massive stars, or the mergers of two neutron stars. Gamma-ray bursts only last seconds to minutes, producing rapidly fading visible light in some cases. The discovery of a gamma-ray transient by the Fermi and INTEGRAL satellites, coincident with the LIGO/VIRGO binary neutron star merger event of August 17th 2017, has revealed the connection between short gamma-ray bursts and the gravitational wave universe in spectacular fashion.

Watcher's main scientific goal is the rapid follow-up of newly discovered transient astrophysical sources such as gamma-ray bursts. Upon receipt of a new trigger, Watcher can be on target within 30 seconds. Despite their vast distances, the incredible luminosities of gamma-ray bursts render them detectable even by a small telescope, once it is fast enough.

The crude localisations of gravitational wave events provided by LIGO/VIRGO pose challenges to narrow field telescopes such as Watcher that must be addressed to ensure the continued relevance of such systems in this exciting new era of multi-messenger astrophysics.

When it is not chasing gamma-ray bursts, Watcher conducts a diverse and rich observing programme that has impact beyond research, supporting learning in astronomy and astrophysics by providing bespoke data to students without requiring them to travel to the telescope. Beyond the traditional academic boundaries, collaboration with an artist has led to Watcher data being used in work exploring the role of women in astronomy.

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