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Immersive experiences for gravitational wave outreach

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The first detection of gravitational waves in 2015 and the birth of multimessenger astronomy with gravitational waves in 2017 represented a real revolution in the way we observe the cosmos. As communication office of EGO, the institution that hosts the Virgo gravitational wave detector, we are constantly looking for new ways to tell the public about these great milestones, in the most engaging and diverse ways possible, not just with words, spoken and written, but through their bodies and all of their senses.

The aim is to illustrate some concrete examples of this approach, but also to reflect on the actual impact of these installations and their effectiveness in contributing to convey scientific content and arouse interest, for example, in some aspects of astroparticle physics. Some immersive interactive experiences, used in the outreach of EGO and Virgo are the following.

Big Bang Machine

The Van 'Big Bang Machine' is a mobile immersive installation, curated by the European Gravitational Observatory (EGO) with the support of the Pisa Foundation, IVECO and the European Union project AHEAD 2020, which takes visitors on a virtual journey through space and time to the origin of our Universe. As if on a science-fiction spacecraft, people of all ages travel back in time and discover the most violent phenomena of our Universe: gigantic black holes, mergers of stars denser than any matter imaginable, all the way back to the very first moments of the Cosmos, where the constituents of matter were generated. The van has toured to several cities in Italy, during festivals and other events, and will also travel abroad.

Space-time Installation

Einstein has shown that mass and energy deform space and alter time. For example, in the cosmos, violent collisions of massive bodies are able to generate ripples, which propagate through the fabric of space-time: gravitational waves. In the "Space-Time" installation, developed by INFN and EGO, visitors move around a room and experience how their body and movements can deform and warp space-time, as if they were a star, a supernova or a black hole.

Projections on the walls simulate the fabric of space-time, and through sensors the user's presence and movements are shown visually in the projection as deformations of this structure. The installation has been included in several exhibitions all over Italy and abroad and it is permanently installed in a room at EGO for all visitors to see.

Black Hole Installation

The "Black Hole" installation, developed in collaboration with INFN, Fondazione Horcynus Orca and Fondazione Messina, encourages the visitor to play with the nature of black holes, and what would happen to our bodies in the proximity of one. Through stunning visuals and original sounds you can see your body's energy get eaten by a black hole, or escape just in time outside of the event horizon. The installation is quite recent, and it debuted in 2023 at "Città della Scienza" in Naples, with great success among people of all ages and backgrounds.

Collaboration(s)

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