

10 fascinating facts you most likely didn't know about the Big Bang

1 During the next decade gravitational wave detectors may reach the sensitivity to observe moments as early as 10^{-35} seconds after the Big Bang.

2 Gravitational waves created 10^{-35} - 10^{-10} seconds after the Big Bang encode information about the most fundamental layer of physics.

3 These gravitational waves created in the wake of the Big Bang might herald new particles and interactions, new symmetries and underlying physical principles.

4 The dark sector came to be during 10^{-35} - 10^{-10} seconds after the Big Bang, so gravitational waves from this era are expected to shed light on dark matter, dark energy, and dark forces.

5 Quantum cosmology, the study of the first 10^{-10} seconds after the Big Bang, relies on elements of quantum field theory, general relativity, finite temperature field theory, thermodynamics, cosmology and more.

That's not a Big Bang!



This is a Big Bang!



6 Between 10^{-35} and 10^{-10} seconds after the Big Bang matter evolved from radiation. Gravitational waves from this era may shed light on the mechanism of this 'baryogenesis'.

7 The Big Bang shattered fundamental symmetries which triggered thermal phase transitions, such as the electroweak transition governed by the Higgs boson.

8 About 10^{-35} - 10^{-10} seconds after the Big Bang the 'cosmic collider' smashed particles at 10^{12} - 10^{24} electron-Volt.

9 Gravitational waves from the earliest moments after the Big Bang will help us to piece together the most fundamental layer of physics with information complementary to colliders and other man-made experiments.

10 Scientists at Monash Physics and Astronomy study how gravitational waves were created after the Big Bang and how to decipher them to learn more about fundamental physics.