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**Prospects and challenges for gravitational-wave astronomy**

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Advanced LIGO, a 2nd generation gravitational wave detector currently being installed is expected to provide the first direct observation of the gravitational waves emitted by binary mergers, and will start to explore previously unobserved corners of the universe. Just as Galileo's optical telescope 400 years ago, this new scientific instrument will answer some questions and raise many others. This triggers a need for a successor to Advanced LIGO. I will explore the science case for such an instrument situated at a new observatory, focusing on the prospects of extending the observation band to lower frequencies. I will look at the technology development needed to achieve the exquisite displacement sensitivity required to listen even deeper into the cosmos.