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The Great Challenges of Gravitational-wave Analysis[1]

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Gravitational-wave astronomy opens up the possibility to study a new side our Universe. To fulfil the potential of gravitational-wave astronomy requires us to (i) identify signals in our data, (ii) characterise the properties of the source, and (iii) combine multiple observations to infer the parameters that describe the population of sources. Each of these steps presents unique computational challenges. We will highlight some of these in the context of the current ground-based detector network, where the rapidly increasing rate of detection demands that analysis is performed efficiency, and future detectors, such as for the space-based Laser Interferometer Space Antenna, where the huge number of overlapping signals will present new problems to solve.

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