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Abstract for an Invited Paper
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Data Analysis of Gravitational Waves and Model Development[1]

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The last few years have seen gravitational wave astronomy mature from its nascent stage with the first direct detections, to a stage where large catalogues of detections enable us to systematically survey the population of merging compact binary sources in the Universe. Both detection and source-characterization rely on sophisticated signal processing and noise mitigation, since the raw signals are buried under detector noise which is non-stationary and non-Gaussian in nature. Understanding and correcting for this is crucial both to maximize the sensitivity and to properly interpret the results of search pipelines. We have performed the first completely independent searches of the LIGO data, in which we improved the modeling of the detector noise, and consequently the reach of public data from the previous runs. We rediscovered all of the official LVC events, as well as several new binary black hole mergers (effectively doubling the population known from the O1 and O2 runs). The new events have provided glimpses into the the underlying complexity of the binary black hole population, with an implied diversity in spins and masses. I will present an overview of the methods and results.

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