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Observing intermediate mass black hole GW190521 with minimal assumptions MAREK SZCZEPANCZYK, University of Florida — The third observing run of Advanced LIGO and Virgo brought a great wealth of new gravitational-wave (GW) detections. One of the most important discoveries was GW190521, the heaviest binary black-hole merger detected to date with a remnant mass of about 140 solar masses. This observation is the first strong evidence for the existence of intermediate-mass black holes, heavier than stellar mass and lighter than supermassive black holes. The significance of GW190521 was determined by the coherent WaveBurst (cWB) pipeline - a search algorithm which operates with minimal assumptions. I will present the capabilities of cWB to detect unexpected GW sources. Since cWB is not dependent on a signal model, it can detect unusual events, such as binaries with highly precessing spins and eccentricities, or when exact signal models are not available. GW190521 is such an exceptional event and its underlaying physics may indicate the merger history or the stellar environment. Based on the cWB reconstruction I will show that GW190521 properties can be explained more accurately by models which incorporate the effects of precession and higher order modes.

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