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Pattern recognition and search for Core-Collapse Supernovae.
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LABORATION — The Laser Interferometer Gravitational-Wave Observatory
(LIGO) advanced generation detectors started operation in September 2015 with
the discovery of Gravitational Waves (GW) from merging black holes. Core-Collapse
Supernovae (CCSNe) are spectacular explosions of massive stars and they are one
of the most interesting potential sources of GW. The dominant emission process
remains unknown, but some of the predicted models have robust features that I will
describe in my presentation. They can be used to differentiate GW signals from
noise. Extreme emission model waveforms such as Piro and Pfahl 2007 or neutrino
driven model such as Yakunin et al 2015 show characteristic trends in time-frequency
maps. It is well known in gravitational wave data analysis that we can improve de-
tection and reconstruction of GW signals by using priors (constrained likelihood
analysis), like for example on the signal time-frequency evolution. In this presen-
tation we discuss how time-frequency patterns priors can be used to improve the
detection efficiency of the coherent Waveburst algorithm for the families of wave-
forms introduced above.

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