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Search for new physics through primordial gravitational waves

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We are currently witnessing the dawn of a new era in astrophysics and cosmology, started by the LIGO/Virgo observations of gravitational waves. These signals also open a new window into processes taking place in the first moments of our Universe. This is due to the fact that GWs propagate freely from the moment of their production unlike like photon based signals which can only propagate freely since the Universe became transparent due to recombination. I will discuss prospects for GW detection with the next generation of experiments. Including the problems connected with observation of a primordial signal in the presence of a foreground produced much more recently by astrophysical objects. The specific early Universe sources I will focus on are cosmological first order phase transitions and cosmic string networks. I will also discuss to what extent we can probe the expansion of the Universe using these primordial GW signals.

Presenter: LEWICKI, Marek