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Multimessenger studies of the physical basis of the modern Cosmology

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Abstract: BSM physics, on which the now standard inflationary cosmology with baryosynthesis and dark matter/energy is based, inevitably leads to cosmological scenarios beyond this standard model, involving specific model dependent choice of models and parameters of BSM physics. Such model dependent cosmological predictions may already found confirmation in the positive results of direct dark matter searches by DAMA/NaI and DAMA/LIBRA experiments, interpretation of the results of Gravitational Wave experiments in terms of Primordial Black Hole merging, observation of Stochastic Gravitational Wave background by Pulsar Timing Arrays, and searches for cosmic antihelium in the AMS02 experiment. We discuss these cosmological messengers of BSM physics as possible signatures of BSM cosmology, specifying the choice of BSM models and determination of their parameters with 'astronomical accuracy'.

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