A Complex for Multimessenger Observations from Gamma Rays to Radio Range and Neutrinos

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Abstract. We present a brief description the observation complex of mutually complementary astrophysical instruments based in observatories of INR RAS, INASAN, CrAO RAS and SAO RAS combined in an informational network with real-time signal exchange. Informational system of the complex should provide processing and analysis of the received information in real-time.

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Over the last decade multi-messenger astrophysics became a world wide routine with a numerous public alert systems. Multi-messenger astrophysics is a new field that combines information carried by photons, cosmic rays, neutrinos and gravitational waves in order to observe and understand nature of a broad range of astrophysical phenomena.

For multi-wave observations of localization areas of these atrophysical events we created an observation complex of mutually complementary astrophysical instruments combined in an information network with real-time signal exchange (details can be found in Dzaparova et al. (2019); Kurenya et al. (2018a,b); Petkov et al. (2018)). Information system of the complex will provide processing and analysis of the received information in real-time, and prompt notification of the results of observations. Gamma-radiation with a threshold energy of about 10 TeV will be registrated by the Carpet-3 array of the Baksan neutrino Observatory INR RAS. In the optical range for quick response to alerts INASAN robot telescopes will be used: IRT35 (Observatory at the peak Terskol), IRT-20 (Zvenigorod Observatory) and robot telescope in Simeiz (under construction). Search for simultanious optical flares will also be performed using a unique high-time multi-channel wide-angle telescope Mini-MegaTORTORA (MMT) of SAO RAS. In future large aperture telescopes will be used for observational follow-ups: 1 meter Zeiss-1000 INASAN telescope in Simeiz and 2 meter Zeiss 2000 telescope at the Terskol peak Observatory. In the radio range observations will be carried out with the 22 meter RT-22 radio telescope in Simeiz (CrAO RAS). On the Baksan underground scintillation telescope search for muon neutrinos with energy above 1 GeV from the regions of localization of candidates in gravitational wave events in the southern hemisphere will be performed.

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