Very high energy emission sources beyond the Galaxy

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Active Galactic Nuclei (AGN) are considered as potential extragalactic sources of very and ultra high energy Cosmic rays. According to the theoretical predictions the Cosmic ray acceleration can take place at the shock created by the expanding cocoons around active galactic nuclei as well as at AGN jets. The measurements of AGN TeV spectra, variability time scale of very high energy emission can provide essential information on the dynamics of AGN jets, localization of acceleration region and estimation of it size. The SHALON observations yielded data on extragalactic sources of different type at energy range of 800 GeV – 100 TeV. During the period 1992 - 2016, SHALON has been used for observations of the AGNi: NGC1275 (z=0.018), Mkn 421 (z=0.031), Mkn 501 (z=0.034), Mkn 180 (z=0.046), 3c382 (z=0.058), OJ 287 (z=0.306), 4c+31.63 (z=0.295), 3c454.3 (z=0.859), 4c+55.17 (z=0.896), PKS1441+25 (z=0.939), 1739+522 (z=1.375). The observation results are presented with integral spectra, images and spectral energy distributions for each of sources at energies above 800 GeV. The data from SHALON observations are compared with ones from experiments at high and very high energies. A number of variability periods in different wavelengths including VHE gamma rays were found in observations of Mkn 421, Mkn 501, OJ 287, 3c454.3 and 1739+522, which correlated with high states at lower energies. For example the last significant flaring state of 3c454.3 at TeV energies was detected in the SHALON observational period of Nov. - Dec. 2010.This increase is correlated with the flares at lower energy range in observations of Fermi LAT. The observations of high-redshift (z>2) sources from first and second Fermi LAT AGN catalogue have been started in autumn-winter period of 2014 year by SHALON. Some results on B2 0242+43 (z = 2.243) and B2 0743+25 (z = 2.979) by SHALON are presented.