High-energy neutrinos from cosmos

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Several astrophysical sources may produce high-energy neutrinos above the atmospheric background. These high-energy neutrinos are considered to have energies typically greater than tens of thousands of GeV. The sources of high-energy neutrinos may include, for instance, our galaxy, the (active) centers of nearby galaxies, as well as possibly the cosmologically distant sites of gamma-ray burst fire balls. A main interaction responsible for the production of these high-energy neutrinos is the collisions between the accelerated high-energy cosmic-rays considered to be protons here and the photons present in these sources. After briefly discussing the basics of proton photon collisions relevant for high-energy neutrino production, I summarize the recent results for high-energy neutrino flux from the above different astrophysical sources. Further, I discuss in some detail the changes that may occur in this high-energy neutrino flux because of possible neutrino flavor mixing. I also discuss the near future prospects for observation of these high-energy neutrinos in large under construction neutrino detectors, commonly known as high-energy neutrino telescopes. In particular, I briefly mention the possibility of high-energy neutrino flavor identification in these high-energy neutrino telescopes [1].

References

[1] H. Athar, M. Jeżabek, and O. Yasuda, Phys. Rev. D **62** (2000) 103007.