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Search for neutrinos associated with solar flare

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The importance of search for neutrino generation during solar flare has been discussed for last 50 years while the detection has not been succeeded yet. Since neutrinos are not affected by interplanetary magnetic field, neutrinos associated with solar flares (solar flare neutrino) provides us information about a particle acceleration mechanism during solar flare. According to theoretical predictions, the solar flare neutrino flux on the earth depends on the location of a solar flare on the Sun. Super-Kamiokande(SK), the world's largest underground water Cherenkov detector, has observed neutrinos since 1996. The predicted probability of detection in SK is $8.5x10^{-1}$ event/flare for a solar flare which occurs on the opposite side of Sun surface from the earth (rear side), and $1.0x10^{-3}$ event/flare from a solar flare of the other side (front side). In order to reduce atmospheric neutrino background for solar flare neutrino search, we have set the search window for the production time of neutrino during a solar flare occurred on front side of the Sun by analyzing data recorded by solar satellites, such as GOES, RHESSI, and Geotail [*Sol Phys* 295, 133 (2020)]. We used Coronal Mass Ejection(CME) event catalog which is made by NASA from SOHO satellite data to determine a search window for solar flare neutrino search from solar flare occurred on rear side of the Sun. In this presentation, we will present the current status of solar flare neutrino search in SK.

Keywords

Solar flare ,Particle acceleration, Neutrino

Collaboration

other (fill field below)

other Collaboration

Super-Kamiokande

Subcategory

Experimental Results

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