Contribution ID: **266** Type: **Contributed e-poster**

An Off-axis Jet Model for Multi-wavelength Afterglow Emission of GRB 190829A detected by H.E.S.S.

Recently, ground-based Imaging Atmospheric Cherenkov Telescopes, such as MAGIC and H.E.S.S., have reported the detection of very-high-energy (VHE) gamma-rays from four gamma-ray bursts (GRB 180720B, 190114C, 190829A, 201216C). One of them, GRB 190829A, was triggered by the Swift satellite, and about 20000 s after the burst onset the VHE gamma-ray emission was detected by H.E.S.S. with ~ 20 sigma significance. This event had more unusual features than the other VHE gamma-ray events. First, it had much smaller isotropic equivalent gamma-ray energy than typical long gamma-ray bursts and is classified as low-luminosity GRB. Second, early X-ray and optical afterglow emission showed a rising part and simultaneously peaked at about 2000 s. We propose an off-axis jet model that explains these observational results. In this model, the relativistic beaming effect is responsible for the apparently small isotropic gamma-ray energy and spectral peak energy. Using a jetted afterglow model, we find that the narrow jet, which has the initial Lorentz factor of 300-500 and the initial jet opening half-angle of 0.01-0.02 rad, viewed off-axis can describe the observed achromatic behavior in the X-ray and optical afterglow. Another wide, baryon-loaded jet is necessary for the later-epoch X-ray and radio emissions. Our model parameters determined by X-ray, optical and radio afterglows may roughly explain observed VHE gamma-ray flux.

Primary author: SATO, Yuri (Aoyama Gakuin University)

Co-authors: Ms OBAYASHI, Kaori (Aoyama Gakuin University); Prof. YAMAZAKI, Ryo (Aoyama Gakuin University); MURASE, Kohta (Penn State); Dr OHIRA, Yutaka (University of Tokyo); TANAKA, Shuta (Aoyama Gakuin University)

Presenter: SATO, Yuri (Aoyama Gakuin University)

Session Classification: Contributed posters