Investigation of solar flares via multi-wavelength observations and theory

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Solar flare is the most energetic explosion in the solar system. The energetic particles can be accelerated to MeV and even GeV energies by the reconnection electric field produced via magnetic reconnection process in the solar corona. The energetic particles can emit X-rays by bremsstrahlung and millimeter or submillimeter emissions by gyrosynchrotron radiation during flares. For the preparation of ALMA solar investigation, we particularly focus on the earlier and recent flare studies at the radio and millimeter/submillimeter wavelengths. Students in the summer program can learn the flare-related magnetic reconnection and particle acceleration theories, as well as the data analysis of solar multi-wavelength observations (especially the observations from Nobeyama Radio Observatory, RHESSI, and SDO).