[초ST-01] New era of pulsar astrophysics-Highlights of recent discoveries by Fermi Asian Network (FAN)

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The successful launch of the Fermi Gamma-Ray Space Telescope has led us into an entirely new era of high-energy astrophysics. The sensitivity of the Large Area Telescope (LAT) on the spacecraft is much higher than that of its predecessors. Furthermore, the data policy of LAT is completely open so that everyone can access the data. All these enable a wide variety of investigations. In order to utilize the golden opportunity at the early stage of this mission, we have established the Fermi Asian Network (FAN) in 2010. Since the establishment, we have carried out intensive investigations in both observational and theoretical aspect. In this talk, I will highlight the recent discoveries made by FAN with particular focus on pulsar astrophysics.

[구ST-02] A Semi-empirical Mass-loss Rate in Short-period CVs

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We present the final results of our study on the mass-loss rate of donor stars in cataclysmic variables (CVs). Observed donors are oversized in comparison with those of isolated single stars of the same mass, which is thought to be a consequence of the mass loss. Using the empirical mass-radius relation of CVs and the homologous approximation for changes in effective temperature T2, orbital period P, and luminosity of the donor with the stellar radius, we find the semi-empirical mass-loss rate M2dot of CVs as a function of P. The derived M2dot is at ~10-9.5-10-10 M$\odot$/yr and depends weakly on P when P > 90 min, while it declines very rapidly towards the minimum period when P < 90 min. The semi-empirical M2dot is significantly different from, and has a less-pronounced turnaround behavior with P than suggested by previous numerical models. The semi-empirical P-M2dot relation is consistent with the angular momentum loss due to gravitational wave emission, and strongly suggests that CV secondaries with 0.075 M$\odot$ < M2 < 0.2 M$\odot$ are less than 2 Gyrs old. When applied to selected eclipsing CVs, our semi-empirical mass-loss rates are in good agreement with the accretion rates derived from the effective temperatures T1 of white dwarfs. Based on the semi-empirical M2dot, SDSS 1501 and 1433 systems that were previously identified as post-bounce CVs have yet to reach the minimal period.