measured for partial regions on the sky. For disks with radius of 20°, 45° and 90°, which are densely overlapping on the sky, we estimate the power excess and its statistical significance relative to the LambdaCDM expectation for some chosen ranges of angular scales. We also investigate the dipolar asymmetry using the power excess maps obtained for some chosen angular scales, and confirm the previously announced consistent dipole directions. The average dipole amplitude and the inner products of dipoles have been measured from the power excess maps at different angular scales. We conclude that although dipole directions are consistent the measured amplitudes are not statistically significant compared to the LambdaCDM model prediction.

[구 GC-26] Physical mechanism of gamma-ray bursts: recent breakthroughs

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Although it is agreed that the gamma-ray bursts (GRBs) invoke highly relativistic jets with bulk Lorentz factors of a few hundreds, the exact physical mechanism producing such powerful gamma-rays still remains debated. Three outstanding and important questions in the field concern (1) the composition of GRB jets (i.e., matter-dominated vs Poynting-flux-dominated), (2) the involved radiative process responsible for the observed gamma-rays (i.e., synchrotron mechanism vs photospheric radiation), and (3) the distance of the emitting region from the central engine where the prompt gamma-rays are released (i.e., ~10^12 cm vs 10^14 cm vs 10^16 cm). I will present recent important breakthroughs that we have made, which answer these three questions.

[구 GC-27] Observing the central engine of GRB170817A

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GW170817/GRB170817A establishes a double neutron star merger as the progenitor of a short gamma-ray burst, starting 1.7 s post-coalescence. GRB170817A represents prompt or continuous emission from a newly formed hyper-massive neutron star or black hole. We report on a deep search for broadband extended gravitational-wave emission in spectrograms up to 700 Hz of LIGO O2 data covering this event produced by butterfly filtering comprising a bank of templates of 0.5 s. A detailed discussion is given of signal-to-noise ratios in image analysis of spectrograms and confidence levels of candidate features. This new pipeline is realized by heterogeneous computing with modern graphics processor units (GPUs). (Based on van Putten, M.H.PM., 2017, PTEP, 093F01.)

KMTNet

[구 KMT-01] The Status and Plan of KMTNet Operation

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외계행성 탐색시스템 운영현황과 계획을 소개한다. 2017년 관측장비 가동율은 97.4% 이며, 시스템이 설치된 3개 천문대에서 천문박명시간을 기준으로 총 10,157 시간이 연구에 할당되었고 총 7,178 시간 관측이 이루어졌다. 관측시스템의 성능개선을 위해 주경 코팅, 돔 레벨조정, 망원경 구동롤러 정렬, 주경 배플 마스크 설치 등 돔과 망원경의 기계부 업그레이드와 카메라 전자부 조정 및 앰프 보드 교체 등이 이루어졌다. 관측효율 향상을 위해 1년간 관측된 약 177,000 장의 자료를 분석하여 불량자료 태깅 기반을 마련했고, 시상모니터링과 관측 스크립트 코드를 개발하여 현재 관측에 적용하고 있다. 관측 자료는 각 연구 프로그램의 자료공개 정책에 따라 영상형태 또는 측광 파일형태로 이용이 가능하며, 관측로그는 홈페이지를 통해 확인할 수 있다. 2020년 10월부터 시작되는 2단계 관측 프로그램 선정을 위해 2019년 상반기에 관측제안서를 접수받아 하반기에 선정을 마칠 계획이며, 다양한 연구주제 발굴을 위해 파일롯 프로그램을 선별 지원할 계획이다.

[구 KMT-02] Maintenance and Improvement of KMTNet Telescope and Enclosure (외계행성 탐색시스템 광시야 망원경과 돔 인클로져의 유지보수 및 성능개선)

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KMTNet 광시야 망원경의 성능 개선을 위해 2017년에