Du-Hwan Han and Myeong-Gu Park
Department of Astronomy and Atmospheric Sciences, Kyungpook National University, Daegu

It is less well known that the properties, especially the mass accretion rate, of accretion flow are affected by the angular momentum of accreting gas. Park (2009) found that the mass accretion rate \dot{m}, mass accretion rate in units of Bondi accretion rate, is inversely proportional to the angular momentum of gas λ, at the Bondi radius where gas sound speed is equal to the free-fall velocity and proportional to the viscosity parameter α, and also Narayan & Fabian (2011) found a similar relation, but the dependence of the mass accretion rate of the gas angular momentum is much weaker. In this work, we investigate the global solutions for the rotating Bondi flow, i.e., polytropic flow accreting via viscosity, for various accretion parameters and the dependence of the mass accretion rate on the physical characteristics of gas. We set the outer boundary at various radius r_{out}=10^3～10^5 r_{Sch}, where r_{Sch} is the Schwarzschild radius of the black hole. For a small Bondi radius, the mass accretion rate changes steeply, as the angular momentum changes, and for a large Bondi radius, the mass accretion rate changes gradually. When the accreting gas has a near or super Keplerian rotation, we confirm that the relation between the mass accretion rate and angular momentum is roughly independent of Bondi radius as shown in Park (2009). We find that \dot{m} is determined by the gas angular momentum at the Bondi radius in units of r_{Sch}c. We also investigate the solution for the rotating Bondi flow with the outflow. The outflow affects the determination of the mass accretion rate at the outer boundary. We find that the relation between the mass accretion and the gas angular momentum becomes shallower as the outflow strengthens.

[구 HT-05] Herschel/PACS spectroscopy of the supernova remnant G21.5-0.9

Heechan Cha(차희찬), Hongjun An(안홍준)
Department of Astronomy and Space Science, Chungbuk National University, Cheongju, 28644, Republic of Korea

We present Herschel Space Observatory far-IR observations of the supernova remnant(SNR) G21.5-0.9. We search PACS-IFU data for 63um [O I], 88um [O III], 157um [C II] emission lines and detect the [O II] and the [C II]. We then produce emission line maps to check the spatial distribution of the elements. We compare the maps to Radio, IR-photometrics, and X-ray images in order to understand interaction of the ejecta with the Pulsar Wind Nebula(PWN) and physical environment in the SNR.

[구 HT-06] X-RAY PROPERTIES OF THE PULSAR PSR J0205+6449 IN 3C 58

Minjun Kim and Hongjun An

Department of Astronomy and Space Science, Chungbuk National University, Cheongju, 28644, Republic of Korea

We measure X-ray timing and spectral properties of the pulsar PSR J0205+6449. Pulsar's rotation frequency ν = 15.20102357(9) s^{-1} and its derivative $\dot{\nu}$ = -4.5(1) x 10^{-11} s^{-2} are measured, and the pulsed spectrum of 2-30 keV is model of power law with photon index Γ_{psr} = 1.07(16) and $F_{2-30\ keV}$ = 7.3(6) x 10^{-13} erg cm^{-2} s^{-1}. We use thermal emission models and non-thermal model to fit the pulsar spectrum and measure the surface temperature and luminosity of the pulsar. The surface temperature T_{∞} = 0.5-0.8 MK and luminosity L_{th} = 1-5 x 10^{32} erg s^{-1} are measure, and this result verifies the previous results known to have low surface temperature and luminosity for the age range of

고천문

[구 HT-07] Solar motion described in the Richan lizhi(日躔曆指) and the Richan biao(日躔表) of the Chongzhen reign treatises on Calendrical Astronomy(Chongzhen lishu 崇禎曆書)

Choe Seung-Urn[1], Kang Min-Jeong[2], Kim Sukjoo[3], Suh Wonmo[4], Lee Myon U.[5]
[1]Seoul national University, Sohnam Institute for History of Astronomy
[2]Institute for the Translation of Korean Classics
[3]Anyang University
4Presbyterian University and Theological Seminary
[5]Chuncheon National University of Education, Sohnam Institute for History of Astronomy

본 연구는 명말(明末)에 역법(歷法)의 개정을 주장한 서광계(徐光啓, 1562~1633)의 기획과 총괄에 의해 편찬되었고, 이탈리아 선교사 로(Giacomo Rho, 羅雅谷, 1593~1638)가 주 저자로 보는《숭정역서》에서 태양의 이론편인 <일전역지(日躔歷指)>와 계산 절차 및 계산수치표가 종합된 <일전표(日躔表)>의 내용을 정리, 분석하였다.

<일전역지>와 <일전표>에 들어있는 몇 개의 내용과 표들은 대부분 16세기 후반부터 17세기 전반에 걸쳐 서유럽의 티코 브라헤(Tycho Brahe, 1546~1601), 마기니(Giovanni Antonio Magini, 1555~1617), 메티우스(Adriaan Metius, 1571~1635) 등의 책에서 동일한 내용이 발견되었다.

판나이 휘집본(潘鼐彙集本; 프랑스 국립도서관본; 《숭정역서》 초기본), 규장각본(《숭정역서》의 후기본), 그리고 사고전서본(《신법산서》)의 내용을 빠짐없이 검토하고, 최근 발간된 《숭정역서합교》의 연구도 반영되었다.

<일전역지>에 태양의 운동을 기술하기 위해 Eccentic 모델을 사용하여 양심차(兩心差), 원지점의 방향, 가감차(加減差), 지구-태양간의 거리 변화 등을 설명하고 있다. 그러나 <일전표>에 나타난 가감차표와 지구-태양간의 거리표는 Equant 모델을 사용하였다. 비교를 위하여 70여년 뒤에 편찬된 《역상고성》 상편 제 4권 <일전역리>에서는 코페르니쿠스 모델인 본륜-균륜 모델이 사용되고 있었다.

본 연구에서는 위에 언급된 3 가지 모델의 차이를 설명하고, 가감차와 지구-태양간의 거리표를 이 모델을 이용하여 계산한 다음, <일전표>에 있는 가감차표와 지구-태양간의 거리표와 비교할 것이다. 《신법산서》에는 Equant 모델을 설명하고 있는데 어디서 오류가 발생하였는지도 규명한다. 그리고 3 가지 모델의 animation을 통해 가감차와 거리차를 쉽게 설명하고자 한다.