구두발표논문 초록

■ Session : 초청강연 I
4월 29일(목) 13:20 - 13:50 제1발표장

[IS-01] Physics of Solar Flares
Tetsuya Magara

Kyung Hee University, Korea

This talk outlines the current understanding of solar flares, mainly focusing on magnetohydrodynamic (MHD) processes. A flare causes plasma heating, mass ejection, and particle acceleration that generates high-energy particles. The key physical processes related to a flare are: the emergence of magnetic field from the solar interior to the solar atmosphere (flux emergence), formation of current-concentrated areas (current sheets) in the corona, and magnetic reconnection proceeding in current sheets that causes shock heating, mass ejection, and particle acceleration. A flare starts with the dissipation of electric currents in the corona, followed by various dynamic processes which affect lower atmospheres such as the chromosphere and photosphere. In order to understand the physical mechanism for producing a flare, theoretical modeling has been developed, in which numerical simulation is a strong tool reproducing the time-dependent, nonlinear evolution of plasma before and after the onset of a flare. In this talk we review various models of a flare proposed so far, explaining key features of these models. We show observed properties of flares, and then discuss the processes of energy build-up, release, and transport, all of which are responsible for producing a flare. We come to a concluding view that flares are the manifestation of recovering and ejecting processes of a global magnetic flux tube in the solar atmosphere, which was disrupted via interaction with convective plasma while it was rising through the convection zone.

■ Session : 관측기기
4월 29일(목) 14:00 - 15:40 제1발표장

[I -1-1] MIRIS에서 적외선 관측용 이미지 센서의 제어를 위한 FPGA 개발
방승철[1], 이대희[1], 위석오[1], 가능현[1], 차상묵[1,2], 박영식[1], 남욱원[1], 정웅섭[1], 이창희[1], 문봉곤[1], 박성준[1], 이덕행[1,3], 표정현[1], 한원용[1]

[1]한국천문연구원 기술개발연구본부,
[2]경희대학교 우주탐사학과, [3]과학기술연합대학원대학교

MIRIS는 과학기술위성 3호의 주 탑재체로 우주 및 지구의 적외선 관측을 위한 두 개의 카메라 시스템을 가지고 있으며 이를 위한 적외선 검출용 이미지 센서가 각각 장착되어 있다. 이미지 센서를 통해 검출된 이미지 데이터를 읽기 위해 고속의 데이터 처리가 요구되어 FPGA 구성방식으로 전용 제어기를 구성하였다. 우주 및 지구의 적외선 관측용 이미지 센서는 구성 및 동작 방법이 달라 요구기능을 만족하는 각각의 전용 이미지 센서 제어기를 개발했다. FPGA를 이용한 이미지 센서 제어기에는 검출된 이미지를 읽기위한 센서 제어 신호발생기, 아날로그 이미지 신호를 디지털 정보로 변환하는 ADC 제어용 신호 발생기, ADC의 출력 신호를 고속의 직렬 통신선로로 출력 하는 기능 외에 동작 모드 및 동작 상태 입력용 DSP 인터페이스, 고속의 직렬 통신 선로에 MIRIS 상태정보 삽입 기능, 제어기의 기능을 원격지에서 확인 할 수 있는 이미지 패턴 생성기능 등을 가지고 있다. 특히, 이미지를 읽기 위한 동작 시에만 클록 주파수를 인가하는 방법으로 FPGA 내부 회로를 구성하여 전류의 소모량을 최소화 하였다.

[I -1-2] Improved kinematic mount design for bar type reference mirror for profilometric measurement large optical surface
Kil-jae Jung[1,2,3], Ho-Soon Yang[3], Hyug-Gyo Rhee[3], Byoung Hyug Jyun[3], Yun-Woo Lee[3], and Sug-Whan Kim[1,2]

[1]*Space Optics Laboratory, Dept. of Astronomy, Yonsei University, Korea*
[2]*Institute of Space Science and Technology, Yonsei University, Korea*
[3]*Korea Research Institute Standards and Science*

Our previous study used a bar-type reference mirror to measure the relative distance to the target surface. The target measurement accuracy was required to 1μm PV for aspheric optical surface up to 1m in diameter. Earlier system suffers from the reference surface deformation when the measuring part moves. In order to reduce the deformation, measuring part and the reference part separated from each order in the new design. This system utilizes a kinematic support assembly using invar flexure to minimize the reference surface deformation under gravity and vibration. The surface deformation requirement of reference mirror is defined as of 0.2μm under gravity and 40Hz vibration. The finite element results, shows reference mirror deformation of 0.164μm. The first resonance mode was computed to analysis 46.05Hz for reference part and 43.44Hz for measuring part. Thesis satisfies the frequency requirement.

[I -1-3] Straylight analysis for preliminary filter and baffle design for New Generation GOCI
Eun-Song Oh[1,2], Ki-Beom Ahn[1,2], Kil-Jae Jung[1,2], Dongok Ryu[1,2] and Sug-Whan Kim[1,2]

[1]*Space Optics Laboratory, Dept. of Astronomy, Yonsei University, Korea*
[2]*Institute of Space Science and Terminology, Yonsei University, Korea*

We present a three-mirror anastigmat(TMA) optical system for New Generation GOCI. In order to reduce the ghost