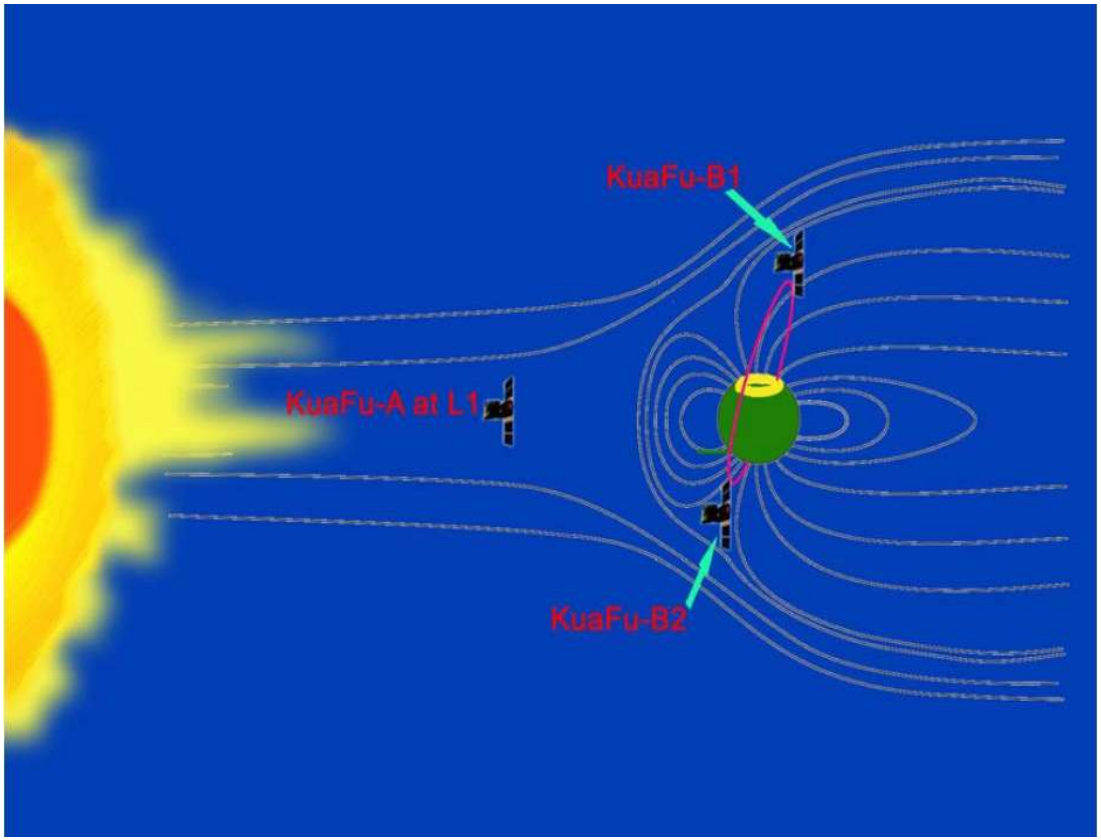
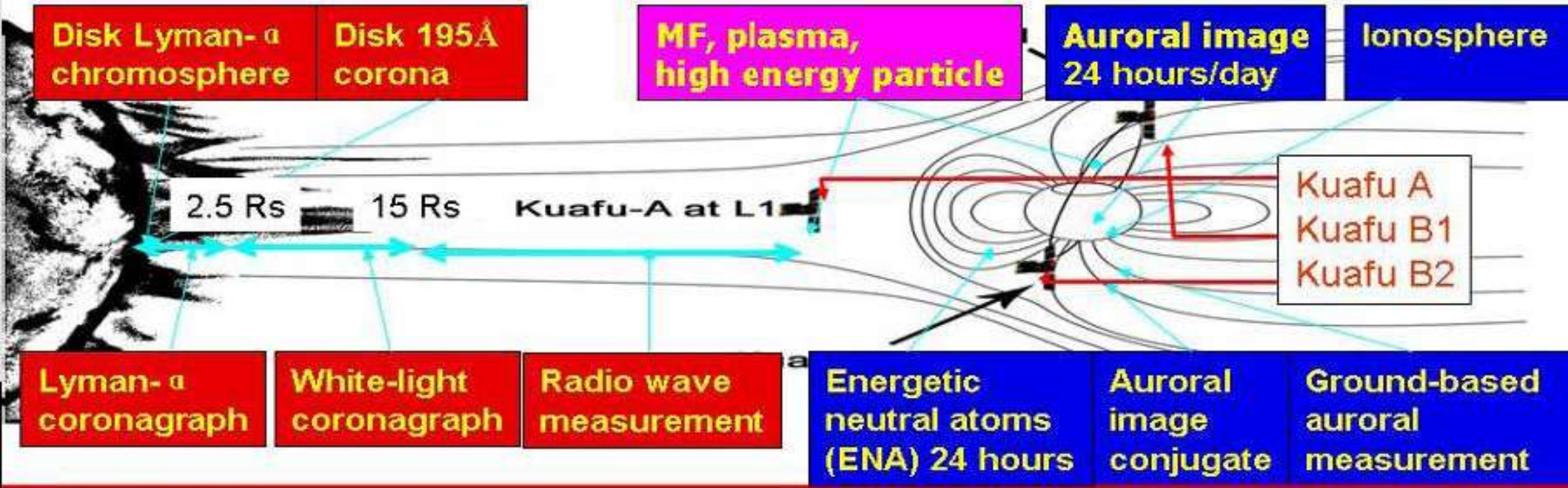
KuaFu



- Science objectives
- Concept
- European Participation
- Current status
- SSWG blessing

KuaFu will observe the complete chain of disturbance from the solar atmosphere to the geo-space



Phenomena

- Filament eruption
- Flare
- CME
- Shock wave, magnetic cloud
- Substorm PBS
- Storm

New science objectives:

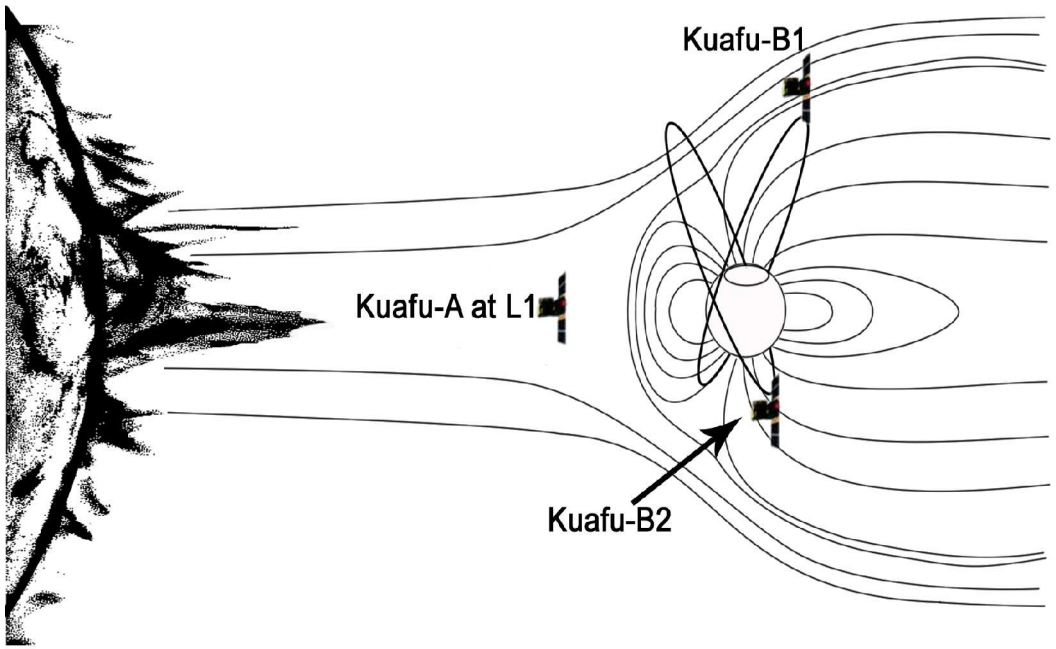
- Precursor of eruption
- Origin and development of flare and CME
- 3D geometry expansion of CMEs (synthesized with Solar Orbiter and Sentinels)
- Tail reconnection
- Energy sink during storm and substorm

rfws, KuaFu presentation to SSWG, October 6, 2005

KuaFu Science Objectives

- Solar source of disturbances: solar flares, CMEs, energetic particles
- Transport of disturbances: interplanetary clouds, radio waves, shock waves, solar energetic particles
- Geo-effectiveness: auroral activities, sub-storms, mangetic storms

KuaFu Concept



- An L1 interplanetary monitoring station
  - continuous observations of the Sun, Corona, and radio waves (e.g.driven by CMEs)
  - continuous measurments of solar wind plasma, energetic particles, fields, and energetic radiation
- Two polar-orbit magnetospheric spacecraft
  - continuous observations of both auroral ovals and ring current regions

KuaFu-A Instrumentation

- EUV/FUV disk imager (EDI) including a Lyman alpha disk imager
- Coronal Dynamics Imager (CDI), including a **Lyman-alpha coronagraph**
- Radio Burst Instrument (RBI)
- Solar Wind Instrument Package (SWIP)
- Solar Energetic Particle Sensor (SEPS)
- Hard X-Ray and Gamma-ray Spectrometer

KuaFu-B Instrumentation

- Aurora imagers:
  - UV imagers in two bands (140-160 nm and 160 – 190 nm)
  - FUV spectro-imager (Doppler shifts for Ly 121.8 nm and OI 135.6 nm
  - wide-field aurora camera
- Neutral Atom Imager
- Magnetometer
- Particle Detectors

KuaFu-A Scientific Payload Group

- Jean-Louis Bougeret, Centre National de la Recherche Scientifique, **France**
- Chris Carr, Imperial College London, **United Kingdom**
- Wei-Qun Gan Chinese, Academy of Sciences, China
- Karl-Heinz Glassmeier, Technical University Braunschweig, **Germany**
- Philippe Lamy, Laboratoire d'Astrphysique de Marseille, **France**
- Pierre Rochus, University of Liege, **Belgium**
- Udo Schühle, Max Planck Institute for Solar System Research, **Germany**
- Rainer Schwenn, Max Planck Institute for Solar System Research, **Germany**
- Shi-Jin Wang, Chinese Academy of Sciences, China
- Robert Wimmer-Schweingruber, Kiel University, **Germany**

⇒Strong European interest!

KuaFu-B Scientific Payload Group

- Hong-Fei Chen, Peking University, China
- Eric Donovan , University of Calgary, **Canada**
- Malcolm Dunlop, Rutherford Appleton Laboratory, **United Kingdom**
- Andrew Fazakerley, University College London, **United Kingdom**
- Claude Jamar, University of Liege, **Belgium**
- Mark Lester, Leicester University, **United Kingdom**
- Susan McKenna-Lawlor, National University of Ireland, **Ireland**
- Jian Wu, China Research Institute of Radiowave Propagation, China
- Tielong Zhang, Austrian Academy of Sciences, **Austria**

⇒Strong European (ESA) interest!

KuaFu: Current Status

- proposed by Prof. Chuanyi Tu (Peking University, China), 1/2003
- pre-study project approved by NSFC as a key project, 10/2004
- first international meeting in Frankfurt, 2004
- Canadian Ravens project merged with KuaFu, 2004
- second international meeting and First International Symposium on KuaFu in Beijing from May 19 to 24, 2005
- assessment report submitted to Chinese Space Agency mid 2005 (http://space.pku.edu.cn/KuaFu/public/KuaFu)
- KuaFu unanimously suggested to CNSA as background project (9/2005); official selection forseen in mid-October 2005

Context

- SOHO is invaluable for space weather
- SOHO has proved to be an unrelenting source of knowledge of the Sun and understanding of stars
- SOHO has been “lost” twice but is still working very well in a mode never envisaged
- We have no backup for SOHO...
- Important contribution to ILWS (no global auroral imaging mission forseen)

KuaFu: What is needed from SSWG?

- scientific “blessing”