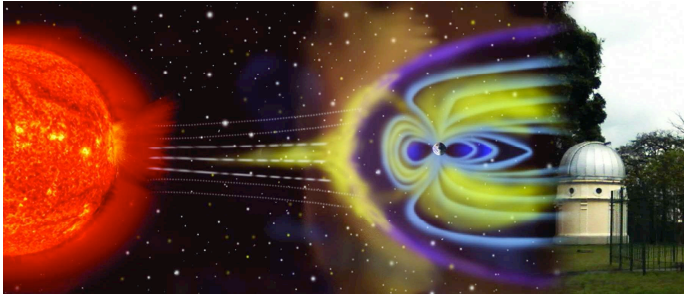




SDO successful  
launch 23 February  
2010

First light end of  
March

SDO is designed to help us understand the Sun's influence on Earth and Near-Earth space by studying the solar atmosphere on small scales of space and time and in many wavelengths simultaneously.

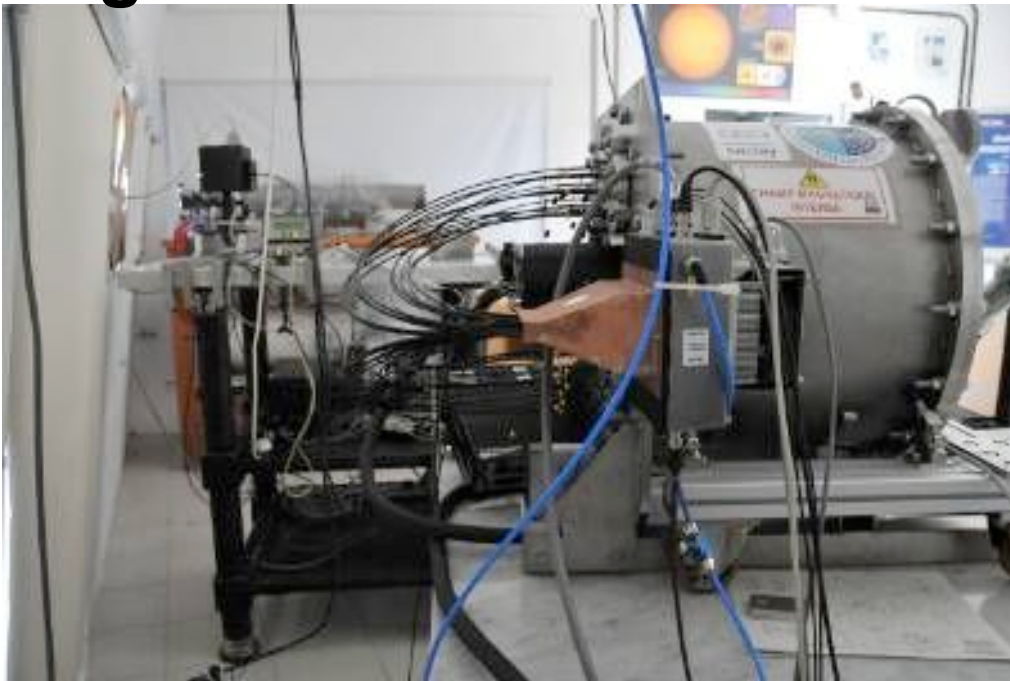


# GOLF-NG: Main objective

## Better determine the dynamics of the solar core

Turck-Chièze, Garcia, Mathur, Pallé, Salabert

**It also put constraints on the solar atmospheric model in presence of open magnetic field**

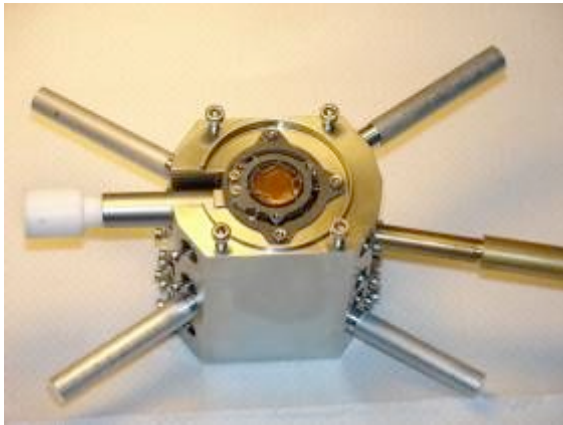


- Measures Doppler velocity like GOLF which has shown the first gravity modes

T-C et al. 2004, Garcia et al. 2007, Garcia et al. and Eff Darwich et al. this conference

To measure quicker and reduces incoherent noise

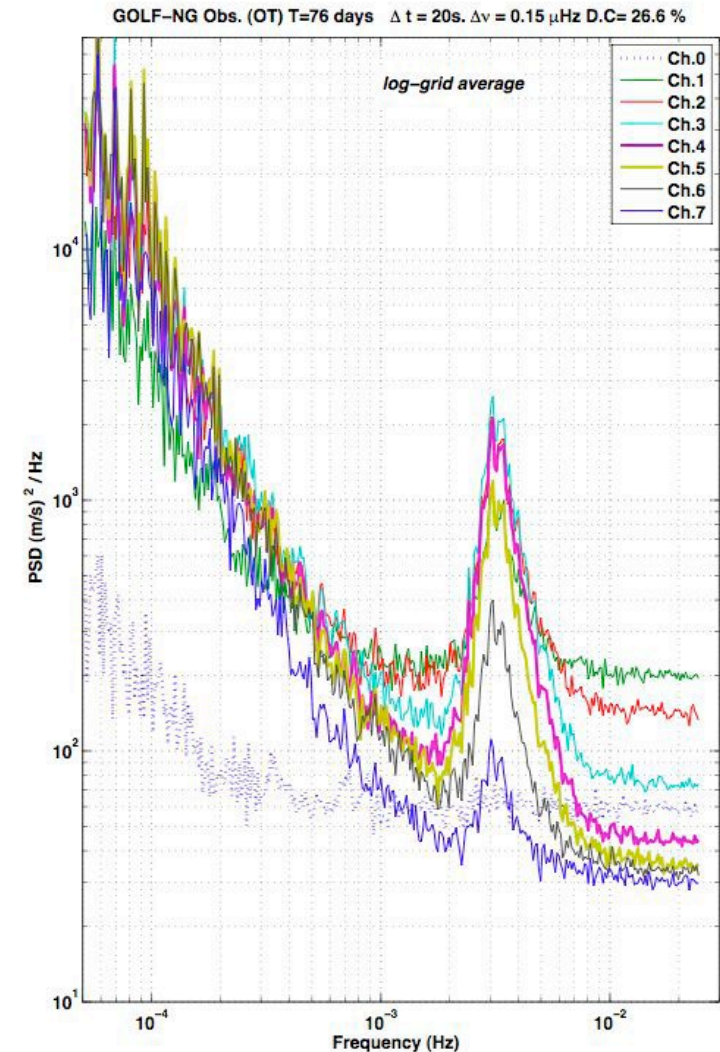
GOLF-NG measures simultaneously at **8 heights** between photosphere and chromosphere



# GOLF-NG prototype: first step Observation summer 2008 Teide

Turck-Chièze et al. 2006, 2008; Salabert et al. 2008, Turck-Chièze et al. 2009

## Validation of the concept





# PICARD fin2009 + prototype GOLFNG

Turck-Chièze et al. 2008, AN

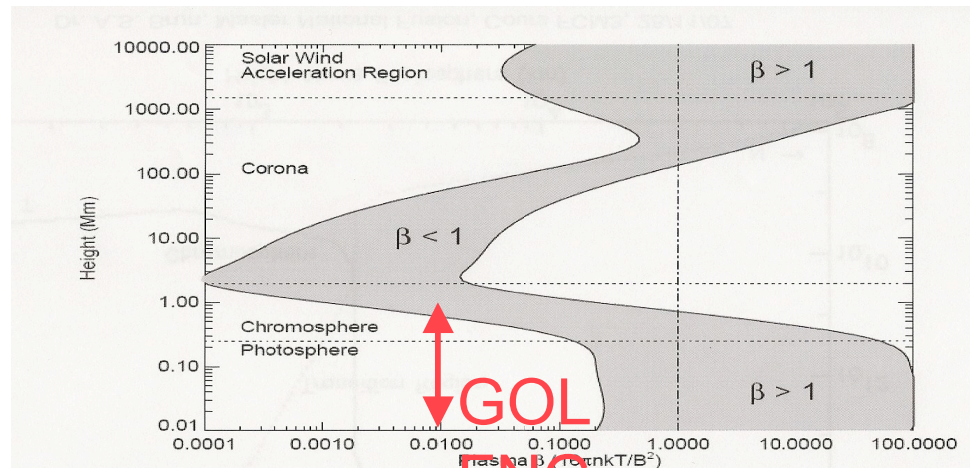
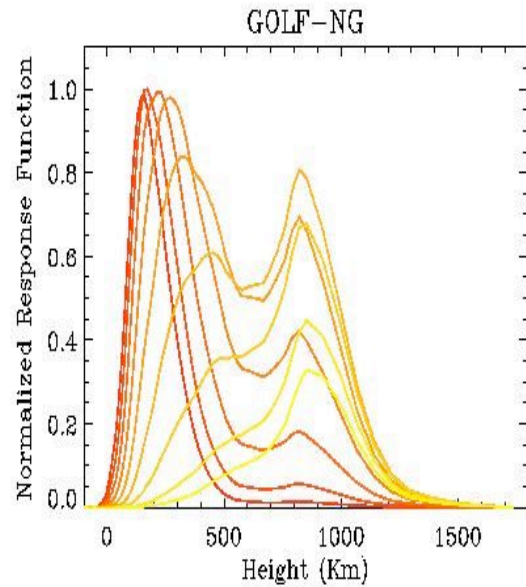
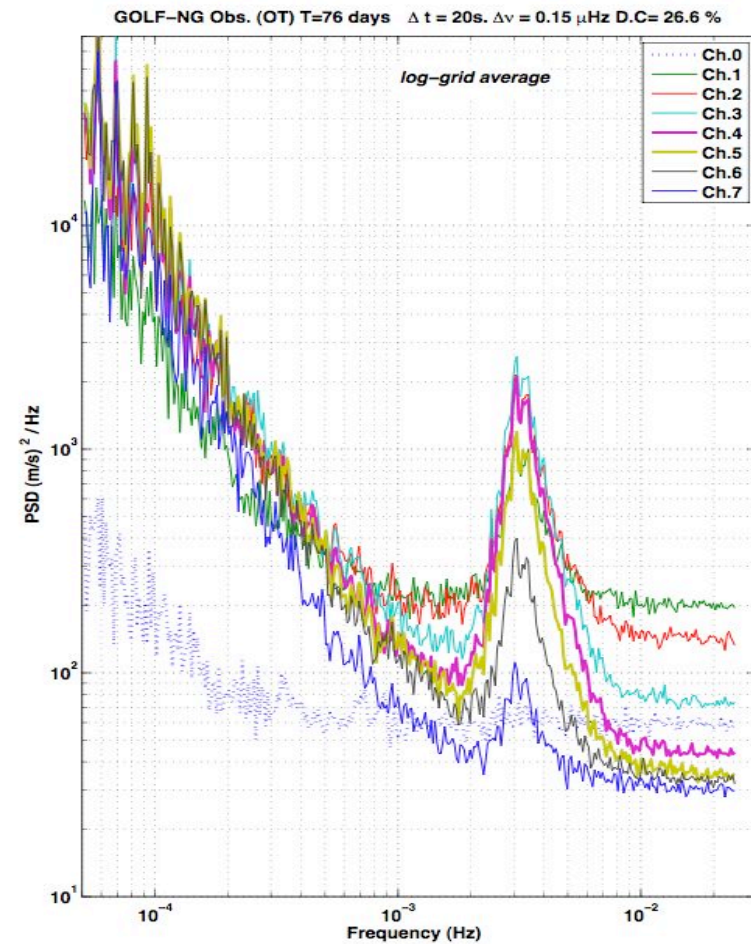
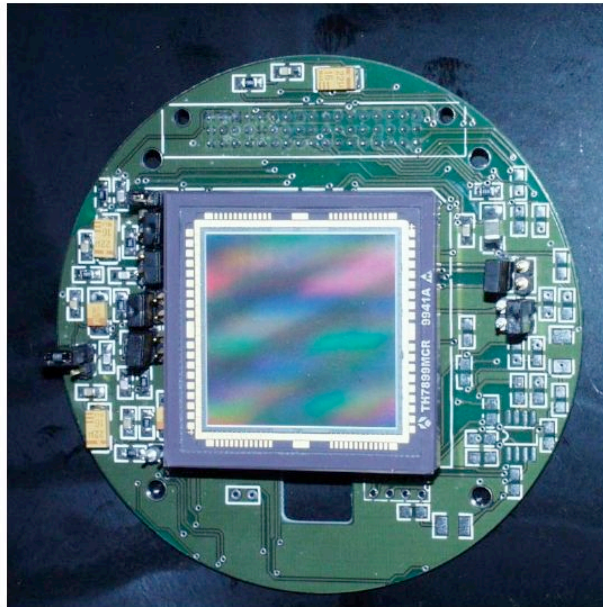
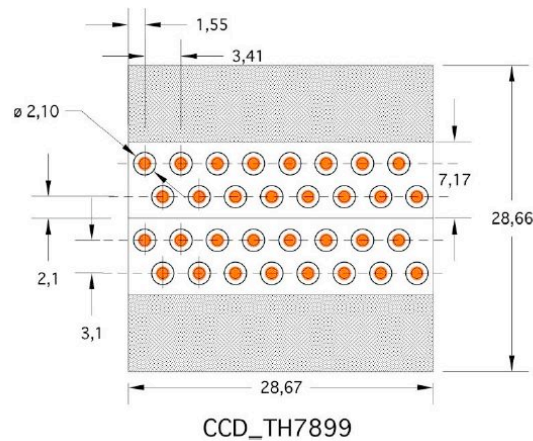


Figure 1.22: Plasma  $\beta$  in the solar atmosphere for two assumed field strengths, 100 G and 2500 G. In the inner corona ( $R \lesssim 0.2R_{\odot}$ ), magnetic pressure generally dominates static gas pressure. As with all plots of physical quantities against height, a broad spatial and temporal average is implied (Gary, 2001).



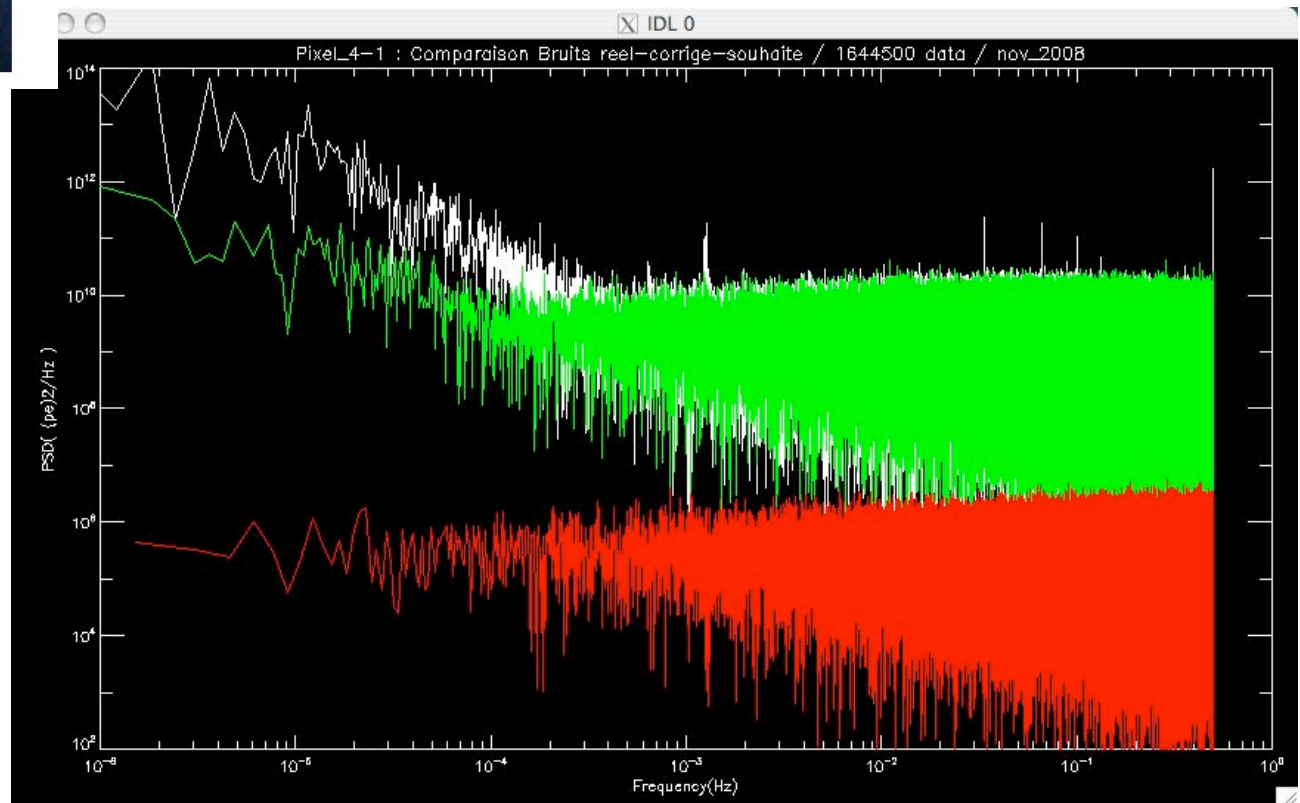


TH7899



**GOLF-NG prototype:** second step  
Observation summer 2010 Teide

**Improvement of the detection  
detection noise smaller than  
statistical noise**





# Cosmic Vision perspective

New insights on the Sun for Space Weather and **Space climate**  
**continuous observations**



Global and local  
seismology after **SOHO**  
**SDO GOLF-NG**

Asphericity, Radius  
variability, Multi  
wavelengths Irradiance  
**SDO/PICARD**

Magnetic flux from  
corona

**Importance of formation flying at the Lagrangian point L1**

**3 proposals:** DynaMICCS, COMPASS

S.Turck-Chièze, P. Lamy et al., 2009, Exp Astron, vol 23, 1017

**HIRISE + spatial and temporal resolution**



Proba 2



Proba 3

Proba signifie « PProject for On-Board Autonomy ».  
Space ESA project to check innovative technology, to get demonstrator with high influence.

Proba-2 has been launched in November 2009 with a lot of technological innovations and UV solar measurements.

**Proba-3**: check of formation flying  
Phase 0: 2006, 120 Meuros,  
**solar coronagraph**  
beginning of phase C/D: Mars 2010,  
**launch 2013 for ASPIICS**

☒  
**For the first time, there will be a permanent eclipse at  $R = 1.05 R_{\text{sol}}$  instead  $2 R_{\text{sol}}$  like in SoHO**

- **Space Weather and Space Climate are new perspectives for solar and stellar physics**
- **They require detailed modelling of the inner and outer solar activity. This is very challenging for internal structure of solar like stars => justify the study of young stars in details too, and interaction between stars and planets**
- **They require very precise and continuous measurements so we need to prepare sophisticated instruments and missions**