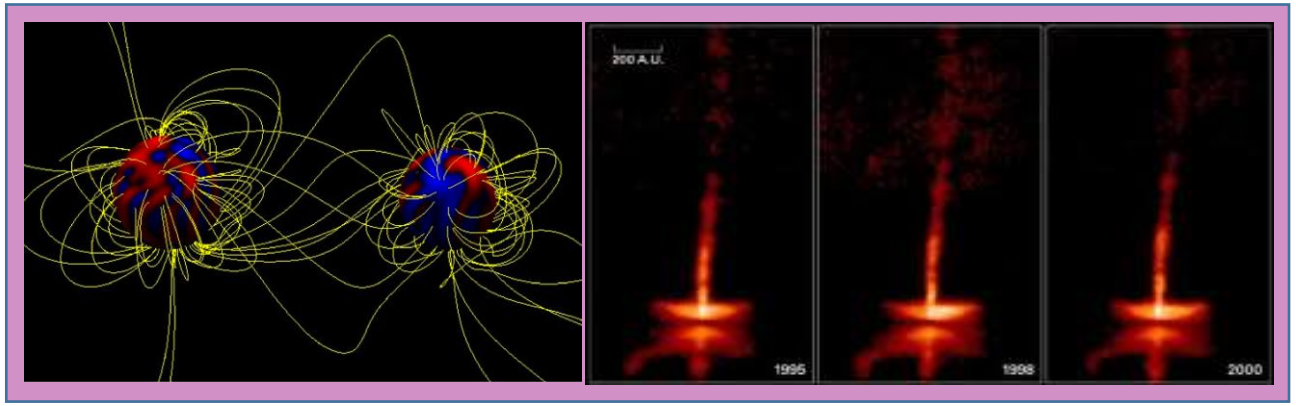
Cool Stars & Star Formation WG



TARGET: sensitivity threshold raised by a factor of 10 to 25 with respect to *Hubble*

WHY?:

→ STAR FORMATION: Reaching farther – to the Gould's Belt ring of star formation for a reasonable statistics

→ COOL STARS: Reaching intrinsically weaker sources

INSTRUMENTATION - REQUIREMENTS

- *High resolution (R=100,000)* UV spectroscopy for studying atmospheric dynamics, young planetary disks, circumstellar medium and astrospheres of stars within 100 pc.
- *Mid resolution (R=35,000)* UV spectroscopy for studying the young population of cool stars in the Taurus, Ophichus, Lupus, Chamaeleon, Orion… star forming regions. The implementation of long-slit spectroscopy modes and coronographic set-ups is fundamental to study the distribution of diffuse matter (jets, disks…) around the source. A spectropolarimetric mode will allow measuring the topology of the magnetic field on cools stars, either evolved or young PMS stars, to the M7 limit.
- *Low resolution (R=5,000)* UV spectroscopy to reach down to the brown dwarf mass scale and below (free-floating Jupiters)

Magnetic fields, dynamos and magnetic energy transport	Magnetic fields and stellar evolution	Winds and outflows	Formation and early evolution of young planetary disks	Binaries and Multiple systems	Astrospheres and the circumstellar environment.
Magnetic fields to the brown dwarf limit and beyond, to Jovian planets scales. Role of chromospheres in the magnetic activity of FGKM stars (e.g. MgII[uv1] lines). Propagation of magnetic energy through the atmosphere, into the uppermost coronal layers. Variability at short time scales (magnetic reconnection, flares).	Dynamo onset and transport processes during PMS evolution. Magnetic fields and atmospheric structure during the evolution (red giant, AGB, post AGB).	Solar-like stars: fast and slow components. Corotation interaction regions. Coronal mass ejections. Jets from PMS stars: interaction between the stellar magnetic field and the accretion disk. Wind impact in the nearest circumstellar environment: accretion disks, young planetary systems, planetary atmospheres. Outflows from evolved cool stars and planetary nebulae. Chemical enrichment of the ISM.	Physics of accretion and outflow in PMS stars. Impact on disk photoevaporation and final dispersal. Impact of UV radiation on the chemical evolution of disks – photoevaporative flows. Gas distribution and planet formation in the innermost regions (< 5 AU) of the disks.	Formation and evolution of close binaries. Stellar activity and multiplicity	