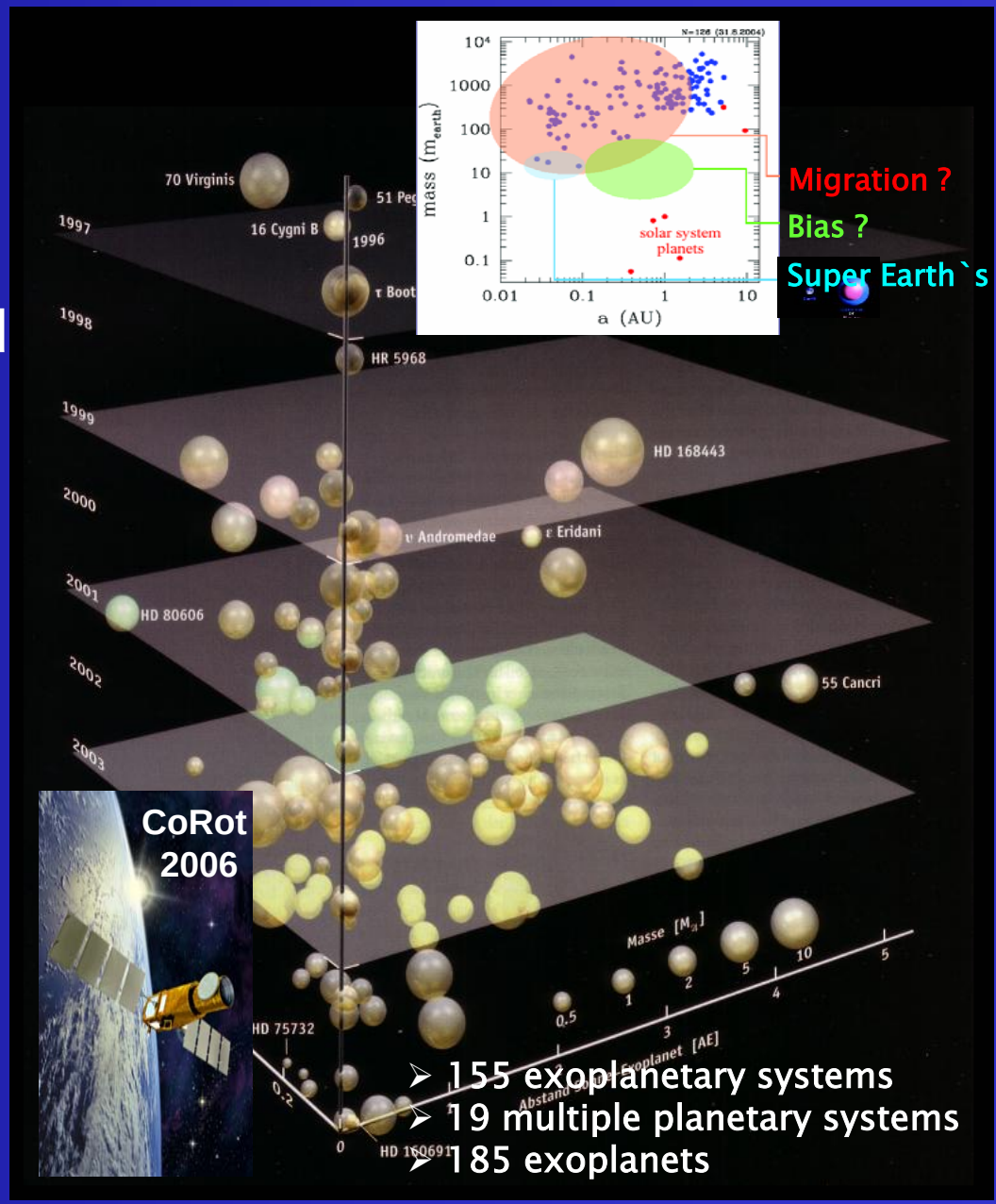
Workshop proposal to the Science Committee

Planets under Extreme Stellar Conditions

WS General Theme

- Explore the extreme stellar radiation and plasma interaction with the atmospheres / exospheres and expected magneto-spheres of hot Jupiter's and lower mass and size close-in exoplanets (from Neptune-like to telluric planets – Super Earth's, Ocean planets) which were/are discovered from space (CoRoT) and ground
- Role of stellar radiation and plasma to the atmospheric energy budget, structure, dynamic and mass-size relation (loss) of hot exoplanets including CoRoT discoveries



Topics

- CoRoT discoveries and ground-based follow up
- Planet formation $\rightarrow$ from Solar System planets to hot exoplanets
- From the atmospheres of gas and ice giants to hot Jupiter's/Neptune's
- Solar/stellar radiation and plasma environment at close orbital distances (activity, stellar winds, CMEs, time evolution, etc.)
- Expected similarities and differences of magnetospheres of Solar System and close-in exoplanets (Jupiter/Neptune $\rightarrow$ hot Jupiter's/Neptune's)
- Solar/stellar wind forcing (magnetospheric protection of atmospheres and response (compression, variation, etc.) to solar/stellar wind plasmas (expected effects on planets < 0.5 AU)

Topics (cont'd)

- Atmospheric dynamics (expected winds of hot Jupiter's or other slow rotating planets – GCMs, etc.)
- Heat budget modeling, thermal evaporation, energetic neutrals
- Non-thermal loss (solar/stellar wind atmosphere erosion/sputtering, polar outflow, test particle and hybrid simulations under extreme plasma conditions)
- Exoplanet statistics (mass-radius trends as a function of orbital distance, what is the influence of long time evaporation/plasma erosion as function of distance to observed hot exoplanets
- Super Earth's and ocean planets (interior structure modelling, mass-radius relation, observational separation between big rocky exoplanets/cores of evaporated gas giants and water/ice-rich planets)
- Extreme stellar conditions and planetary habitability

Timeliness

- About 185 exoplanets were discovered from the ground until today and more than 200 hot exoplanets are expected to be discovered by the CoRoT space observatory which will be launched during October 2006

- Outcome of the WS may also help to identify future needs for future missions (Kepler, Gaia, SIM, Darwin/TPF), supporting ground based observations, and theoretical modelling

- Moreover, synergies between exoplanet and Solar System research will be identified

Scientific Relevance

- For characterizing the discovered hot exoplanets within their extreme stellar environments it is highly timely to bring theoretical and observational expertise from the planetary/Solar System community together with exoplanet researchers

- Existing models which are developed for numerous Solar System objects and their application to the extreme planetary environments of observed exoplanets leads to real comparative planetology and will enhance our understanding how the atmospheres of Solar System planets evolved under the extreme conditions of the young Sun

WS Date & Structure

- late 2008 - early 2009
- 5 days, ca. 45 participants,
  plenary sessions, no splinter sessions,
  no working groups

Proposed Convenors and Co-convenors

- Helmut Lammer (IWF, AAS, Graz)
- Magalie Deleul and Pierre Brage (Observatoire d Astrophysique de Marseille, LAM, Marseille)
- Therese Encranaz (Observatoire de Paris, CNRS, Paris)
- Heike Rauer (DLR, Berlin)
- Malcolm Fridlund (ESTEC, Noordwijk)
- Bob Johnson (Univ. of Virginia)
- Yuri N. Kulikov (PGI, RAS, Murmansk)
- Rickard Lundin (IRF, Kiruna)
- Norbert Krupp and Björn Grieger (MPI, Lindau)
- Uwe Motschmann (Univ. Braunschweig)
- Esa Kallio (FMI, Helsinki)
- Jeff Linsky (JILA, Univ. of Colorado)
- Ignasi Ribas (IEEC, CSIC, Barceona)
- Tristan Guillot (Obs. De la Côte d`Azur)
- Alain Léger (IAS, CNRS, Orsay)
- Christoph Sotin (Univ. de Nantes)
- F. Selsis (ENS, Lyon)