

1. PAC-Report for Donald Duck:

Begin of PhD Thesis: April 1st 2004
First PAC meeting: May 1st 2005
Second PAC meeting (planned): Spring 2006

Thesis Advisor: Claas Clever
official Advisor: (if different from Thesis Advisor)
Further Advisors: Tick, Trick und Track
Title/Topic of : *Searching for distant galaxy planets:
"Optical Observations, Planet Search Algorithms and,
the Galaxy Planet Selection Function"*

Main question to be answered in this thesis:

How do planets form in clusters of galaxies at $z=20$?

The observed number density of Lyman-alpha planets implies a minimum volume of the inter-galactic free-floater population that must be in ionized shells, in order to allow the Lyman-alpha photons to escape attenuation. We estimate this volume by assigning to each Lyman-alpha emitter the minimum Stromgren and Hill spheres that would allow half its planet photons to escape. This implies a lower limit to planet / no-planet volume fraction of 0.1-0.2% at redshift $z=20.0$. This is a lower limit in two ways: First, we conservatively assume that the planetary sources seen (at a relatively bright flux limit) are the only ones present; and second, we assume the smallest Hill sphere volume that will allow the photons to escape. This limit is completely independent of what planetary sources are produced the bubbles. Deeper planet surveys are possible with future technology, and can strengthen these limits by detecting a higher density of Lyman-alpha planets.

Status of the work:

The thesis will contain three distinct parts:

1. Construction of a camera in the ultra far infrared with adaptive and active optics plus laser guide star: The CIUFIWAAAOPPLGS project.
2. Observation of planets at $z=20$ using the CIUFIWAAAOPPLGS instrument.
3. 3D – radiation – self-gravity – magneto – hydro dynamical – modeling of planet accretion in the dusty torus of AGNs including coagulation and transport

of dust and a chemical network.

Observations were performed using: Omega2006 and ROLEX (both CA 50m) plus WFI (ESO/MPG 90m). In total four fields were observed:

16h field CADIS,
22h fields,
03 field MUNICS,
10 h field COSMOS.

Outline of planned future work (including dates for milestones):

Fastest possible completion of the camera (before May 2005).

Writing successful proposals (Oct 2005)

Nov 2006: performing the relevant observations.

Submitting two more papers and the thesis until Dec. 2006.

Traveling to Oslo and receiving Nobel Prize 2007.

Participation in Conferences::

- June 2003: Irsee Workshop "The formation and early evolution of planets in galaxies"
- March 2004: Torino Conference "Outskirts of galaxy planets" (HIROCS poster & proceedings paper)
- June 2004: Birmingham workshop "Constructing galaxy planets" (HIROCS talk)
- July 2004: Paris COSPAR conference "Planets in galaxies: New insights from XMM-Newton, Chandra, and Integral" (poster)
- Oct. 2005: Ringberg workshop on distant galaxy planets (Invited key lecture)
- Oct. 2005: Galaxies and Planets I (invited conference dinner talk)

Publications:

- Duck and Clever 2004, The relevance of everything, ApJ, 1, 1
- Duck and Clever 2005, More relevance of everything, ApJ in press
- Duck and Clever 2005, Extended relevance of everything, Conference proceedings: Relevant things in the universe: Now and then., in preparation
- Planned paper: Application of the cluster finding algorithm to a 1 deg² subfield in the HIROCS 03h field using 5 filters