5.1 Potsdam Team (AIP) — Euro3D RTN-Contractor

Team Leader	Dr. Martin M. Roth (Euro3D Coordinator)
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Staff	Name	Degree	Status	%	Work Package
1.	Martin M. Roth	PhD	head of	50	1.2, 2.2, 2.4, 3.1, 3.8, 3.10, 3.11
2.	Andreas Kelz	PhD	postdoc	10	1.2, 1.7, 3.1
3.	Thomas Becker	Dipl.Math.	postdoc [1)]	50	1.2, 2.2, 2.3, 2.4, 2.5, 2.7, 3.1
4.	Petra Böhm	Dipl.Math.	technical staff	50	2.4, 2.5, 2.7, 3.1, 3.9
5.	Detlef Schönberner	PhD	full professor	5	1.2
6.	Matthias Steffen	PhD	staff astronomer	5	1.2
7.	Stefan Gottlöber	PhD	staff astronomer	10	1.5, 1.6, 1.7

[1)] PhD in Q4-2001

Local team description :
The Potsdam team is one of the younger groups among the more established members of the Euro3D network. Located in eastern Germany, the AIP traditionally has had a strong theoretical background in solar and stellar astrophysics, and cosmology. More recently, the institute has engaged in major telescope and instrumentation projects, and established completely new RTD facilities (see picture overleaf). The PMAS project, a high efficiency UV-visual 3D spectrophotometer, has become the spearhead project of these new RTD activities. From the beginning (1996), PMAS was designed for the purpose of developing the method of crowded field 3D spectroscopy, which is now one of the major tasks of the proposed network. PMAS will be commissioned in 2001 at the Calar Alto 3.5m telescope, after 5 years of development in parallel with the planning, construction, and installation phase of the new technology building, which was under the responsibility of the Euro3D coordinator, Dr. Roth. Other current projects at AIP include inkind contributions to the Large Binocular Telescope in Arizona (AWG units), the STELLA robotic telescope (Tenerife), and the GREGOR solar telescope (Tenerife).

The coordination of the Euro3D research and training network will be a challenge for a former East-German institute, located in the less-favoured region of Brandenburg, near Berlin. Nevertheless, management skills to coordinate projects of considerable spending profile have already been demonstrated successfully during the past 5 years (see below). The Potsdam team had initiated the former attempt to create a 3D spectroscopy network with an RTD proposal in 1999, which however did not receive funding, but was suggested to be re-submitted as a research training network proposal.

The team has existing collaborations with the IAC group, and the Russian group at the Selentchuk 6m telescope. Observations with MPFS/6m, and INTEGRAL/WHT have been instrumental for developing at AIP the **P3d** data reduction package, prior to the commissioning of PMAS. First results have been obtained from these observations for emission-line spectrophotometry of faint, background limited planetary nebulae in M31, and for crowded field spectroscopy LBV candidates and their nebular environments in M33 (work in progress).

The AIP team has a strong interest to intensify links to teams LYO, MPE, ESO, LEI for the further development of software, and to CAM, ESO, LEI, MIL for collaboration in science projects.

Some major research interests of the AIP team in the context of the Euro3D network include the following: stellar interiors (mixing processes, nucleosynthesis, equation of state), wind envelopes, AGB stars (dusty envelopes, chemistry of ejecta, mass loss), stellar evolution (mass budget, elemental yields, detached dust shells, planetary nebulae, white dwarfs), formation of large-scale structure (N-body simulations of dark matter, statistical description of large-scale structures), galaxy formation (clustering of dark matter/baryonic gas, hydrodynamic simulations of galaxy and cluster formation, phenomenological description of star formation and evolution of galaxy colours, time dependence of the merging of dark and baryonic halos, mechanisms of biasing).

Managerial Experience :
The network coordinator, Dr. Roth, holds a scientific staff position at AIP since 1994 as Head of Instrumentation. His more than 10 years experience with project management and coordination include the installation of the Wendelstein Observatory Telescope and instrumentation in southern Germany, and insight in cutting-edge instrumentation projects through participation in the proposal and conceptual design phase of FORS for the ESO-VLT. Over the past 7 years, he has established a new instrumentation group at AIP. He was responsible for the coordination of the planning, construction and installation phase of a modern technology building which was finished in 2000 (total budget: DEM 23 000 000). He is responsible for the PMAS project, a new UV-visual

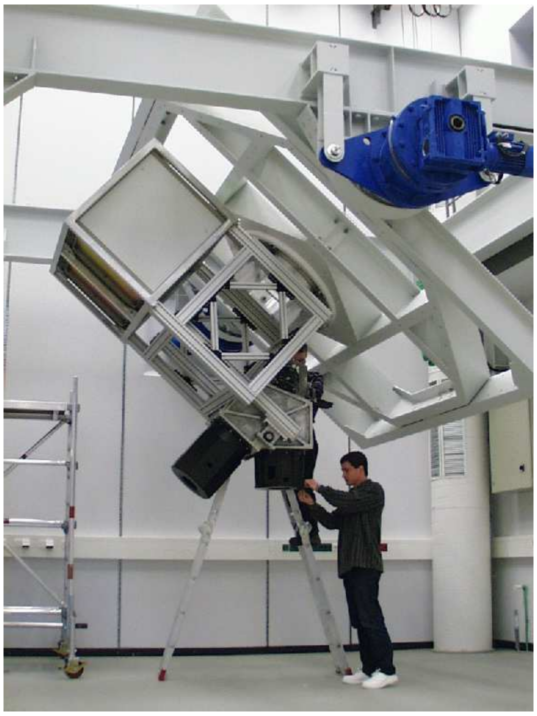
3D spectrophotometer, which will be commissioned at the Calar Alto 3.5m telescope in 2001. He has more than 16 years of observing experience and insight in modern ground-based observatories. His experience in training and teaching include the responsibility for diploma and graduate students since 1987.

Significant recent publications :

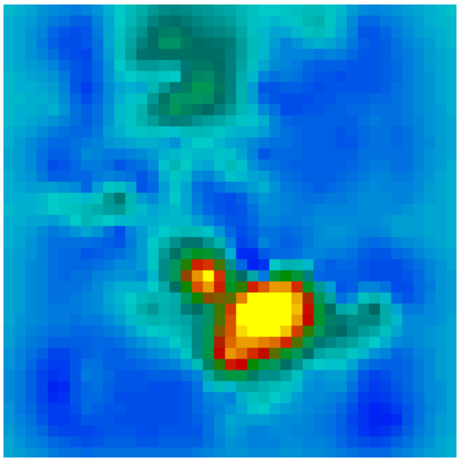
Roth, M.M. et al. 2000, *"PMAS design and integration"*, Proc. Optical and IR Telescope Instrumentation and Detectors, eds. M. Iye, A.F.M. Moorwood, SPIE 4008, p. 277

Steffen, M., Schönberner, D. 2000, *"On the origin of thin detached gas shells around AGB stars. Insights from time-dependent hydrodynamical simulations."* Astronomy & Astrophysics 357, 180

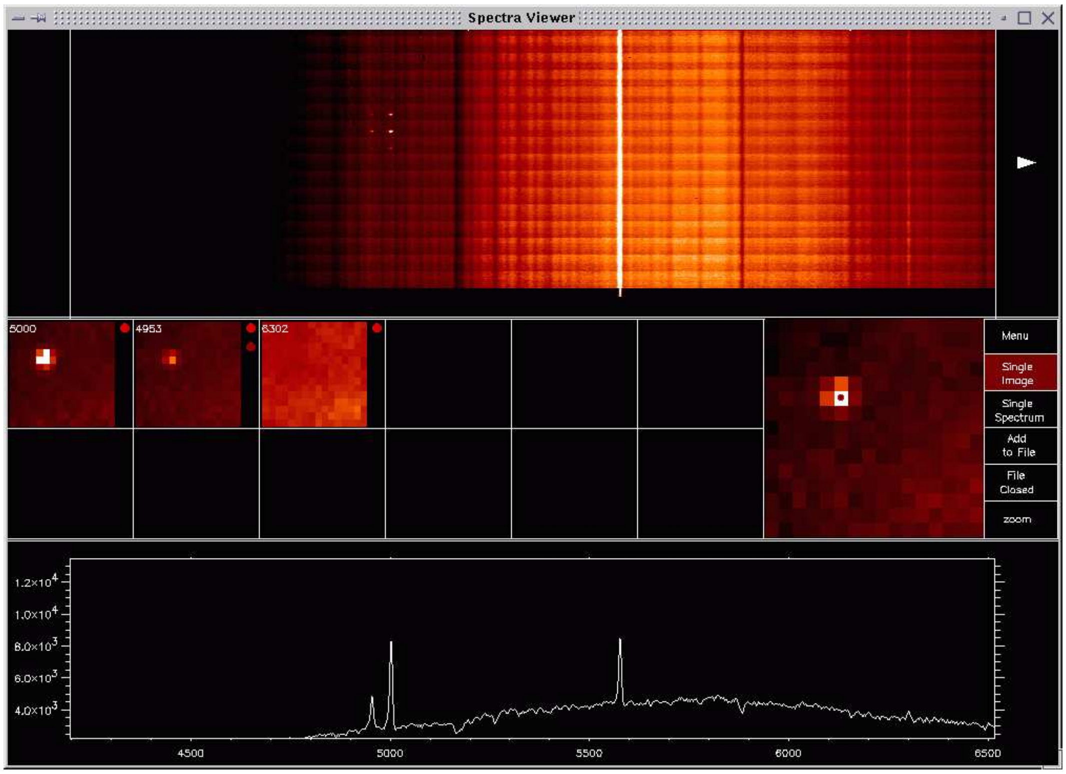
AIP new technology building



PMAS pre-assembly on telescope simulator



Crowded field 3D spectroscopy: monochromatic image of INTEGRAL data cube of a 7.8”x6.4” field in M33 (interpolation), observed at WHT in January 2001 under subarcsecond seeing conditions. Data reduced with the AIP P3d software package.



Data cube analysis software tool, written by graduate student Thomas Becker, AIP