RESPONSE TO THE 2016-2025 ASTRONOMY DECADAL PLAN EXPOSURE DRAFT
Australian National Institute for Theoretical Astrophysics (ANITA)
February 27, 2015

We thank the National Committee for Astronomy, and in particular, the Decadal Planning Executive and Working Groups, for their excellent distillation of the community's capabilities, aims and needs for the 2016-2025 period. We applaud their inclusion of theory and HPC as key components of the next decade of Australian astronomy, but feel that overall the impact of this is somewhat lost in the text, and that concrete recommendations are lacking.

In response to the Draft, ANITA propose the following changes. We have specifically identified sections of the Draft, and proposed updated text to address our concerns. Note that to align with the structure of the observational facilities recommendations, we have provided concrete virtual facility (HPC) recommendations for the community.

1) We request that the importance of Fellowships to the resourcing of the theoretical community as per the ANITA Strategic Plan be explicitly acknowledged in the Decadal Plan document. We recommend phrasing this as follows:

"The availability of Fellowship schemes is of key importance to Astronomy, particularly in theoretical and computational areas. This is reflected in the 40 Future Fellowships awarded in Astronomical and Space Sciences between 2009 and 2015, of which 45% were awarded to researchers in theoretical and computational areas. We strongly recommend the continuation of such schemes, and that large infrastructure investments be accompanied by investment in associated Fellowship schemes, following the successful model of the Hubble and Einstein fellowships in the US."

2) Top-level Priorities (pages 3, 31)

Priority 5: The equivalent of 30%[1] of a top 100 supercomputer available for Computational Astrophysics and Data Intensive Research (encompassing both theoretical and observational data). World-class high performance computing facilities, astronomy-specific personnel, and software capability to enable processing, delivery and curation of large data sets, large- and small-scale theoretical simulations, and data storage. Funding for astronomy-specific HPC personnel and training to maximise impact and accessibility for all astronomers to national facilities.

[1] 100 million CPU-hours requirement for 2014, scaled by a factor of two each year, consistent with the growth rate of Top-500 HPC resources. Current top 100 supercomputers have ~300 million CPU-hours per year available, yielding our 30% request level. This value includes the requirements of both observational, theoretical and data intensive research-focused astrophysics, encompassing simulations, data processing, storage and access through virtual observatories and cloud services. The total requirement can be distributed across a number of HPC and data processing centres.

We request that, given the stated impact of theoretical astrophysics over the last 10 years, that this item be placed higher than number 5 in the priority list.

p. 5 Training and careers

Recognition of the wider definition of an astronomy career, including the key roles for HPC-trained personnel working within astronomical research groups, and lobbying of funding bodies to recognise these personnel in research funding proposals.

p. 5 and throughout, where “facilities” are listed but only describe observational facilities

In parallel to observational facilities, equal weighting to consideration of “virtual observatories” for theorists and simulation researchers, including, but not limited to, HPC facilities and associated trained HPC and data intensive research personnel. The inclusion of HPC as a “facility” is considered in Figure 10.1. The direct costing for this may be difficult to determine, but can be approximated by the cost share for 30% of a major facility. Clear inclusion of HPC as a core facility of comparable importance to observational facilities highlights the critical contribution virtual facilities make to scientific discovery, and is the only way to maximise both scientific return and value-per-dollar-invested.

Document prepared by the ANITA Steering Committee, on behalf of the ANITA membership.

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