
An Adaptive Optics Community Response to Astro2020

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Abstract

In the recent Astro2020 Decadal Report, "Pathways to Discovery in Astronomy and Astrophysics for the 2020s" Adaptive Optics (AO) was identified as a crucial technology for a variety of reasons. These included an emphasis on high-contrast imaging and AO systems as being part of future technology development especially with application to the two US ELT projects. Instrument upgrades were also identified for existing 4-10m class telescopes which would incorporate upgrades to existing AO systems. As noted in the Report:

"the central role of AO instrumentation and the importance of further development are rapidly growing, with novel concepts pushing toward wider areas".

"Visible AO has high potential scientific return by opening up an entire wavelength regime to high angular resolution studies. The goal is to exploit the smaller diffraction limit ($\sim \lambda/D$) of telescopes in the optical, yet both the coherence length and time decrease at shorter wavelengths ($\sim \lambda/5$), requiring wavefront sensing at high spatial and temporal frequencies that are currently technologically challenging. This is an important developing area for the 2020s - 2030s."

"Such investments in AO systems development is a key risk mitigation strategy for ELTs, whose full resolution and sensitivity potential can only be realized with AO, and which is recognized as the most important technical risk for both GMT and TMT".

The last US Community AO Roadmap, held in 2008, served to identify and prioritize AO related research topics which could be referenced in proposals submitted to various NSF/AST instrumentation programs. We will hold a workshop to develop a 2023 Community Response document to provide feedback and suggested priorities to various funding agencies, such as NSF, NASA, and DoE, as to the AO R&D priorities to meet the technical and science objectives outlined in Astro2020 for ground-based AO, both stand-alone and in support

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of space missions. This NOIRLab sponsored workshop will be held in May 2023 and will comprise ~ 40 attendees broadly representing the US Community in terms of science and technology, along with agency representation. We will report on the outcome of this workshop outlining the identified R&D priorities.

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