The Magdalena Ridge Observatory Interferometer: a high-sensitivity imaging array

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and the MROI team
The first generation of facility interferometers is now online.
Over 40 astrophysics papers were published in the last year alone.
What is needed now?

• Longer baselines?
• Bigger apertures?
• More spectral resolution?
We need to move from modelfitting to imaging
Imaging needs many telescopes

4 telescopes          6 telescopes          8 telescopes
We need the sensitivity to access the really interesting classes of target
The fringe tracker determines the faintest object we can observe

- The fringe tracker must achieve a usable signal-to-noise ratio in an integration time fixed by the atmosphere.

- If we cannot fringe-track on a target, we can never observe it interferometrically, no matter how much observing time we have.

- Using larger apertures does not help much.
The Magdalena Ridge Observatory is a Congressionally-funded project in New Mexico
The MRO Interferometer is being built by a partnership between NMT and the Cavendish
The MROI site at 10,500ft is nearly ideal for an interferometer.
The MRO Interferometer is optimized for imaging and sensitivity

- 10 1.4m telescopes
- 4 scalable configurations
- Baselines 7.5-350m

- Optical & NIR operation
- Vacuum transport and DL
With 10 relocatable telescopes, MROI will have unequalled imaging capability.

Array layout

Instantaneous $(u,v)$ coverage
The beam train is optimized for maximum throughput
With group delay coherencing, it will be able to track fringes on 14\textsuperscript{th} magnitude targets
MROI Schedule and Team

• **Team**
  – Manager – E. Bakker
  – System Architects – D. Buscher & C. Haniff
  – Scientist – M. Creech-Eakman
  – Software – T. Coleman
  – Controls – C. Parameswariah
  – Beam Combiners – J. Young
  – Alignment System & Optical Designs – C. Jurgenson
  – Site Characterization – D. Klinglesmith

• **Schedule**
  – Buildings and infrastructure – Aug ‘06-Aug ‘07
  – Telescopes – Oct ‘07-Nov ‘09
  – DL Carts – Oct ‘07
  – NIR Arrays – Feb ‘08
  – First closure phase – Aug ‘08
  – Commissioning thru Sept ‘10
  – Shared-risk science begins
Notice to Proceed on the interferometer buildings was issued August 4th

Beam Combining Area

Mechanical Equip. Room

Delay Line Area

Control Building
The first delay line prototype is under construction in Cambridge
The Beam Combiner downselect is due in November
The MROI design is focused on 3 key Science Missions
MROI can (in theory) obtain ~10cm spatial resolution on GEO satellites
Open Positions

- Lead Opto-Mechanical Engineer
- Mechanical Engineer
- Instrument scientist
- Programmers
- Postdocs and students

- [http://www.mro.nmt.edu](http://www.mro.nmt.edu)