The Megamaser Cosmology Project

Jim Braatz
Lincoln Greenhill
Jim Condon

Mark Reid
Christian Henkel
Fred Lo
“While models with $\Omega_{\text{DE}}=0$ are not disfavored by the WMAP data only, the combination of WMAP data plus measurements of the Hubble constant strongly constrain the geometry and composition of the universe”
Spergel et al. 2006

“The single most important complement to the CMB for measuring the DE equation of state at $z \sim 0.5$ is a determination of the Hubble constant to better than a few percent.”
Hu 2005
Measuring Distances to H₂O Megamasers

Requires:
- Detect the best candidates (GBT surveys)
- Measure accelerations (GBT Monitoring)
- Assess VLBI calibrators (VLA snapshots)
- VLBI imaging (VLBA + GBT + Eff)
- Modeling

Goal:
- 10+ distances to obtain H₀ with better than 3% uncertainty

NGC 4258
GBT Spectra of Maser Disks
UGC 3789

Braatz and Gugliucci, in prep.

$M_{BH} \sim 9 \times 10^6 \, M_{\odot}$
Resources Required for the MCP

• Schedulable
  - GBT time for surveys and monitoring (~ 250h per year)
  - VLBA+GBT+Eff time for mapping (~ 100h per year)
  - VLA time for calibrator assessment (~ 15h per year)

• Procedural
  - Benefit from improvements in GBT and HSA dynamic scheduling
  - Cross-telescope proposals defined by the science goals

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http://www.cfa.harvard.edu/wmcp