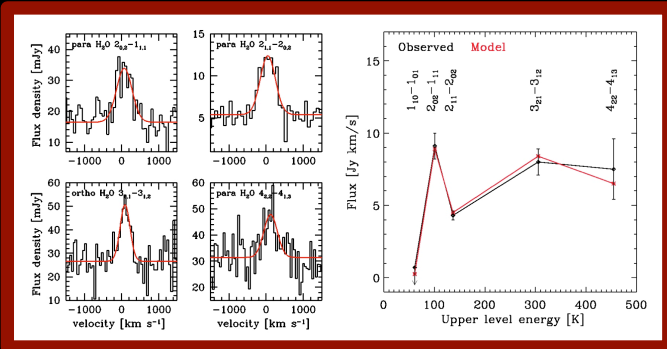
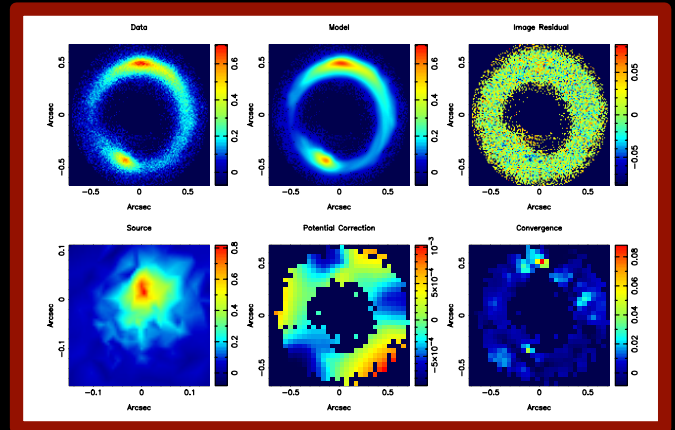


# Gravitational Lensing Research Highlights

A Sagittarius mass ( $2 \times 10^8 M_{\text{sol}}$ ) dark matter substructure is detected at redshift 0.881. The detection requires the mass fraction contained in substructure to be higher and the slope of the mass-function to be flatter, than are predicted from CDM simulations.

Publication: Vegetti, Lagattuta, McKean et al., submitted for publication

ASTRON people involved: John McKean



Four different transitions of water were detected from the ultra-luminous infrared quasar APM 08279+5255 at redshift 3.96 (the most distant detection of water to date), using the Plateau de Bure interferometer. The water vapour has revealed an opaque region of  $\sim 550$  pc where the dust is heated to extreme temperatures ( $\sim 220$  K) by star formation instead of the central AGN.

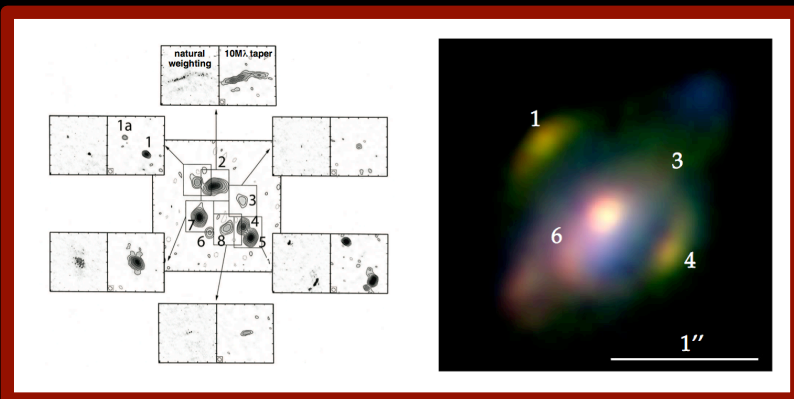
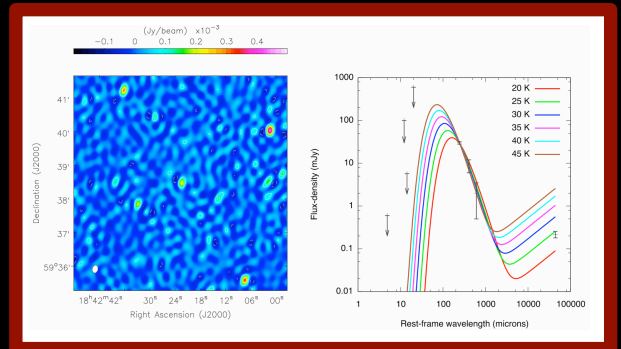
Publication: van der Werf, Berciano-Alba, Spaans et al., ApJL, in press

ASTRON people involved: Alicia Berciano-Alba

1.4 GHz WSRT continuum imaging is used to calculate the star-formation rate and dust temperature of a bright sub-mm galaxy at redshift 3.9296.

Publication: McKean, Berciano-Alba, Volino et al., 2011, MNRAS, 414, L11

ASTRON people involved: John McKean, Alicia Berciano-Alba, Valeriu Tudose, Michael Garrett



Gravitational lensing (VLBI) and stellar kinematics (Keck rotation curve and adaptive optics imaging) break the disk-halo degeneracy for the spiral galaxy B1933+503 at redshift 0.755. The shape of the dark matter halo, the dark matter fraction, and the properties of the disk have been calculated.

Publication: Suyu, Hensel, McKean et al., submitted for publication

ASTRON people involved: John McKean

