

# ALMA Science

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## What primary beam does CASA use for ALMA 12-m antennas? And what is the actual ALMA 12-m antenna primary beam, for that matter?

Brian Mason - 2020-09-21 - Offline Data Reduction and/or CASA

The voltage pattern assumed by CASA for the ALMA 12-m primary beam is currently hard coded to a uniformly illuminated 10.7-m dish with 0.75m blockage, resulting in an Airy disk whose FWHM is **similar** to a 12m Gaussian illumination with -12dB taper and 0.75m blockage. However its actual functional form will differ and in particular the sidelobes will be higher than the real ALMA dish sidelobes are.

The **actual** ALMA antenna primary beam shape is a matter of active work, but the main lobe is reasonably well represented as having a FWHM of 1.13  $\lambda/d$ . This is what you would expect from a 12m with a Gaussian voltage illumination pattern that is tapered to -10 dB (rather than -12 dB as specified in design documents) that has a 0.75m blockage. The reasons for these discrepancies are under investigation.

See also Section "Single-dish Response" of the [ALMA Technical Handbook](#).

Related Knowledgebase article:

- ["How do I model the ALMA primary beam, and how can I use that model to obtain the sensitivity profile for an image mosaic?"](#)