

# ALMA Science

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## How does the CASA viewer convert from Jy/Beam to K (brightness temperature)?

Dirk Petry - 2024-10-08 - Offline Data Reduction and/or CASA

The de facto implemented formula is

$$T_K = \text{valueBeam} * \text{SPEED\_LIGHT\_FACTOR} / ( \text{beamSolidAngle} * \text{FREQUENCY\_FACTOR} * \text{pow}(\text{frequencyValue}, 2) )$$

where

valueBeam is the intensity in Jy/beam

$$\text{SPEED\_LIGHT\_FACTOR} = 9\text{E-}10 = 1\text{E-}26 * 3\text{E}8^{**}2$$

$$\text{FREQUENCY\_FACTOR} = 2 * 1.38\text{E-}23$$

beamSolidAngle [sr] is computed using  
 $\text{pi} * (\text{bmin\_arcsec} / 206264.8) * (\text{bmaj\_arcsec} / 206264.8) / 4. / \ln(2)$