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Central free-free-dominated 880 μm emission in II Zw 40

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The central star-forming region in a blue compact dwarf galaxy, II Zw 40, was observed in the 340 GHz (880 μm) band at ~ 5 arcsec (250 pc) resolution with the Submillimetre Array (SMA). A source associated with the central star-forming complex was detected with a flux of 13.6 ± 2.0 mJy. The structure is more extended than the beam in the east-west direction. The SMA 880 μm flux is analyzed by using theoretical models of radio spectral energy distribution along with centimetre interferometric measurements in the literature. We find (i) that the SMA 880 μm flux is dominated (~ 75 per cent) by free-free emission from the central compact star-forming region, and (ii) that the contribution from dust emission to the SMA 880 μm flux is at most 4 ± 2.5 mJy. We also utilize our models to derive the radio--FIR relation of the II Zw 40 centre, suggesting that free-free absorption at low frequencies (ν a several GHz; λ a several cm) and spatial extent of dust affect the radio-FIR relation.

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