We present a detailed radio study of the young supernova remnant (SNR) G292.0+1.8 and its associated pulsar PSR J1124–5916, using the Australia Telescope Compact Array at observing wavelengths of 20, 13 and 6 cm. We find that the radio morphology of the source consists of three main components: a polarized flat-spectrum central core coincident with the pulsar J1124–5916, a surrounding circular steep-spectrum plateau with sharp outer edges and, superimposed on the plateau, a series of radial filaments with spectra significantly flatter than their surroundings. Absorption argues for a lower limit on the distance to the system of 6 kpc.

The core clearly corresponds to radio emission from a pulsar wind nebula powered by PSR J1124–5916, while we conclude that the plateau represents the surrounding SNR shell. The plateau’s sharp outer rim delineates the SNR’s forward shock, while the thickness of the plateau region demonstrates that the forward and reverse shocks are well-separated. Assuming a distance of 6 kpc and an age for the source of 2500 yr, we infer an expansion velocity for the SNR of ~ 1200 km s⁻¹, an ambient density ~ 0.9 cm⁻³, an ejected mass ~ 5.9 M☉ and a supernova explosion energy ~ 1.1 × 10⁵¹ erg. We interpret the flat-spectrum radial filaments superimposed on the steeper-spectrum plateau as Rayleigh-Taylor unstable regions between the forward and reverse shocks of the SNR. The flat radio spectrum seen for these features results from efficient second-order Fermi acceleration in strongly amplified magnetic fields. Overall, SNR G292.0+1.8 shows an unusual set of properties not seen in any other SNR. This source may reflect a unique stage in evolution, only seen for systems at an age of ~ 2500 yr, and only for which there is both a bright SNR shell and an energetic associated pulsar.