

Talk at Splinter Meeting

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MONITORING THE GALACTIC CENTER AT 3MM WITH ATCA

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The supermassive black hole, Sagittarius A* (Sgr A*), at the centre of the Milky Way undergoes regular flaring activity which is thought to arise from the innermost region of the accretion flow. We performed the monitoring observations of the Galactic Centre to study the flux-density variations at 3mm using the Australia Telescope Compact Array (ATCA) between 2010 and 2014. We obtain the light curves of Sgr A* by subtracting the contributions from the extended emission around it and the elevation and time dependent gains of the telescope. The observations detect five instances of significant variability in the flux density of Sgr A*, with variations between 0.5 to 1.0 Jy, which last for 1.5 – 3 hours. We use the adiabatically expanding plasmon model to explain the short time-scale variations in the flux density. We derive the physical quantities of the modelled flare emission, which give a source expansion speed of $v_{\text{exp}} \sim 0.014\text{--}0.035 c$, source sizes of ~ 1 Schwarzschild radii, spectral indices of $\alpha_{\text{synch}} = 0.35\text{--}0.80$, with the peak of the synchrotron radiation occurring at frequencies of few hundred GHz. These parameters imply that the expanding source components are either confined to the immediate vicinity of Sgr A* by contributing to the corona or the disc, or have a bulk motion greater than v_{exp} . No exceptional flux density variation on short flare time-scales was observed during the approach and the flyby of the dusty S-cluster object (DSO alias G2). This is consistent with its compactness and the absence of a large bow shock.