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Emission from the Black Hole Sagittarius A* and its immediate environment

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New NIR data allows a new interpretation of the fast moving dusty S-cluster object (DSO/G2) which was earlier interpret as a core-less gas and dust could approaching SgrA* on an elliptical orbit. With the ESO VLT/SINFONI instrument we detect spatially compact Brγ line emission from the DSO at all epochs before and after its peri-bothron passage implying that it is an embedded - presumably young - star rather than a freely expanding gas cloud. However, its outer shell may very well be subject to tidal disruptionr. Several polarized flares were observed with NACO at the ESO VLT during 2004 to 2012, allowing us to study the statistical properties of linearly polarized NIR 2.2 microns light from Sgr A*. The results constrain the physical conditions of the accretion process onto this super-massive black hole. Since the emission is due to optically thin synchrotron radiation, this preferred polarization angle is very likely coupled to the intrinsic orientation of the SgrA* system i.e. a disk or jet/wind scenario associated with the SMBH. If they are indeed linked to structural features of the source the data imply that SgrA* must be a very stable system - both in terms of geometrical orientation of a jet/wind or an accretion disk and in terms of the variability spectrum which must be linked to the accretion process. It may very well be that the close fly-by of the DSO has an effect on the accretion flow onto SgrA*. It cannot be excluded that the recent bright X-ray flares are linked to the DSO fly-by. Just looking at the statistics of NIR and X-ray flux density excursions, such bright X-ray flares may also be expected from a single state power law distribution of flare fluxes. Hence - polarization and variability measurements are the ideal tool to probe for any change in the apparently very stable system as a function of the DSO fly-by.