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High angular resolution Sunyaev Zel'dovich observations: the case of MISTRAL

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The interaction of the Cosmic Microwave Background (CMB) photons with hot electron gas in Galaxy Clusters and surrounding medium can be detected through the Sunyaev Zel'dovich effect. When this effect is detected with high enough angular resolution (~10") it allows astrophysicists to study the physics of galaxy clusters, relaxed and non-relaxed clusters, and detect filamentary structures which could give the possibility to detect the Cosmic Web. These observations are one of the main targets of the MISTRAL instrument together with a long list of scientific targets spanning from extragalactic astrophysics to solar system science. MISTRAL (MIllimetric Sardinia radio Telescope Receiver based on Array of Lumped elements kids) is a millimetric camera working in the W–band (77–103 GHz) which will be hosted on the Sardinia Radio Telescope (SRT), the Italian 64-m radio telescope located near Cagliari at 600m above the sea level, managed by INAF. It is being built as a facility instrument by the Sapienza University for INAF, funded by a PON contract for the upgrade of the SRT at high frequency. It will consist of a compact cryostat hosting the re–imaging optics, cooled at 4 K, and a 408–pixel array of photon–noise limited lumped element kinetic inductance detectors, manufactured at CNR-IFN, and cooled at a base temperature lower than 300 mK.

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