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Near Infrared and visible TiN- based parallel-plate capacitor kinetic inductance detectors

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We report on the development of near-IR and optical parallel plate capacitor lumped-element kinetic inductance detectors (LEKIDs) for astronomical applications. The parallel-plate capacitor is made of a TiN base electrode, Al₂O₃ dielectric and Nb upper electrode. For a given frequency readout bandwidth, compared to the interdigitated capacitor geometry, the use of the parallel-plate capacitor allows us to significantly reduce the size of optical LEKIDs resonating at low frequencies (1-1.3 GHz) [1]. The resonators which were successfully frequency multiplexed thanks to the change of the upper electrode area, exhibit internal Q-factors up to 3×10^6 at 72 mK. The array was illuminated using a white light and 890 nm monochromatic near infrared LEDs. In this paper, we will present the design, fabrication and experimental results.

[1] Beldi, S., Boussaha, F., Chaumont, C. et al. J Low Temp Phys (2018) 193: 184. <https://doi.org/10.1007/s10909-018-2035-8>.

Less than 5 years of experience since completion of Ph.D

Y

Student (Ph.D., M.Sc. or B.Sc.)

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