

NEWS -WP8: Status

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from the agreement & H2020 NEWS web page

Work Package Number	7	1 - 48					
Work Package Title	Advanced superconducting techniques for particle detectors (Research, Training, Transfer of Knowledge)						
Lead Beneficiary	UNIGE						
Participant Short Name	UNIGE	FNAL	KIPAC	CALTECH			
Person-months per Participant:	47	0	0	0			

Objectives:

- O7.1:** Develop the design of antenna coupled superconducting TES bolometers sensitive to the polarization for large area focal plane of microwave telescope at 50-100 mK and very high sensitivity test in the LSPE Balloon cosmology program.
- O7.2:** Choice of the material and characterization of thermal and transport properties of superconducting material for the detector.
- O7.3:** Define fabrication processes and tools and provide a TES Bolometer prototype for laboratory qualification test.
- O7.4:** Integration of demonstrative few channel instrument in CMB telescope and data taking and analysis.
- O7.5:** Investigation of materials, structures and operating mode of superconducting single photon detector in the 100 GHz band.
- O7.6:** Fabrication of a prototype of superconducting single photon detector in the 100 GHz band and first operation test.

WP8	D8.1	D16	Single Photon Detector	The feasibility of a single photon detector at ...	UNIK	Report	Public	30 Jun 2020
WP8	D8.2	D17	Data from CMB Telesco	A small prototype will be assembled and short c...	UNIK	Report	Public	30 Jun 2021

Status @ Sept 17

- Preliminary work with FNAL via web-conf (before summer)
- Contact person at FNAL: Aaron Chou, E. Z. Barzi
- Since case: GHz Axion as light DM → “High frequency axion searches at 100 GHz and above”
- Inverse Primakoff effect in Sikivie Haloscope: axion to photon in tuned cavities → need of high Magnetic Field
- FNAL group is involved in these investigations using large EM cavities.
- Photon detection methods have been considered:
 - 2 level atoms in cavities
 - Micro-array of tuned cavity
 - Q-bit circuit as photon detector
 - Tuned Q-dot/SET
 - Antenna Coupled Micro/nano TES
- Work at Genova presently: preliminary study of an Antenna Coupled TES with very small heat capacity and working in the 10mK temperature range to achieve sensitivity good enough for 100 GHz single photon thermal detection.