

# Surface properties of gold coated surfaces used in the discharge system of LISA.

*Monday, 30 September 2024 18:10 (20 minutes)*

LISA will integrate in the gravitational reference system (GRS) an ultra-violet (UV) illumination device that will avoid excessive charge build-up on the test masses (TM) by producing appropriate photoelectron currents.

The properties of the gold-coated surfaces of the TM, and of the electrode housing that surrounds it, play a crucial role in determining the performance of this discharge system: surface work function, roughness, polycrystal orientation, adsorbed contaminants on surface etc... are examples of parameters relevant for the photoemission process. Equally important are their variability as a consequence of manufacturing, manipulations during the inevitable assembly phases in air, the exposure to desorbed molecular species during bake-out processes, and during the planned storage for many years, until exposure to vacuum in flight.

Understanding if surfaces during these processes maintain the same characteristics regarding photo emissivity, as well between on ground test and flight model, is of importance and in case determinate the principal surface parameters responsible of photo emissivity change.

We present here the ongoing investigation of the information offered by several surface characterization techniques that we are considering, with the aim of improving the reliability of the surface monitoring strategies to be implemented from the initial GRS manufacturing phases of the first prototypes, up to the flight models.

**Primary authors:** Dr CAVALLERI, Antonella (Dipartimento di Fisica, Università di Trento); Prof. PASQUALI, Luca (Dipartimento di Ingegneria 'E. Ferrari', Università di Modena e Reggio Emilia); DOLESI, Rita (Istituto Nazionale di Fisica Nucleare); Dr CANTERI, Roberto (Fondazione Bruno Kessler (FBK), Micro Nano Facility (MNF)); Dr DELL'ANNA, Rossana (Fondazione Bruno Kessler (FBK), Micro Nano Facility (MNF)); KLASER, Teodoro (Università degli studi di Trento); WEBER, William (Istituto Nazionale di Fisica Nucleare)

**Co-authors:** VETRUGNO, Daniele (Università di Trento/Istituto Nazionale di Fisica Nucleare); DIMICCOLI, Francesco (TIFPA); VENTURELLI, Francesco (UniTN/INFN-TIFPA); SALA, Lorenzo (UniTrento/INFN/TIFPA); Dr SARRA, Paolo (OHB Italia S.p.A); Prof. VITALE, Stefano (Università degli studi di Trento); FERRONI, Valerio (Istituto Nazionale di Fisica Nucleare); CHIAVEGATO, Vittorio (Istituto Nazionale di Fisica Nucleare)

**Presenter:** KLASER, Teodoro (Università degli studi di Trento)

**Session Classification:** Coating and Materials

**Track Classification:** Coatings and Materials