Precise resonator methods investigation of dielectric and metal at 40GHz-500GHz frequency range and in 4K-900K temperature interval.

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Abstract: Resonator techniques for precise measurements of gazes and condensed media in wide frequency range from 40 GHz up to 500 GHz and in the temperature interval from 4K up to 900K are presented. The measurement methods are the absolute ones and self "calibrated" that means it is not necessary to use the prior information. Concrete values are calculated from the measured of the resonator frequency and the resonator curves widths of empty and loaded resonator.
The high pure Silica glass and mono crystal Quartz as the reference materials for refractive index and loss tangent values are presented. The results of investigations of modern superdielectrics with extralow absorption (including polymeric materials) are presented. The results of reflectivity investigations of extrapure metals and real alloys for cooled reflectors of modern radiotelescopes are presented.

Bio:

Vladimir V. Parshin, born Dec. 19, 1948; graduated from Radio physical faculty of Gorky State University in 1972. From 1973 to 1977 he worked as an engineer in the Radio physical Scientific Research Institute in the field of millimetre wave radars. In 1977 he changed for Institute of Applied Physics where he works at present as senior scientist. He specialises in quasioptical and waveguide science and technique at MM and SubMM ranges. He actively worked on the development of microwave technique for active and passive remote sensing of environment and investigation of microwave emission from Earth substrates for navigation purposes and participated in a lot of expeditions aimed to testing of corresponding facilities.

During recent 20 years V. Parshin gradually concentrated his activity in the field of precise resonator microwave spectroscopy. He has measurement facilities, based on the open Fabry-Perot resonators, allowing the measurement of extremely low losses at MM/SubMM-waves in wide temperature interval. Alongside with it he worked in the creation and investigations of materials with outstanding properties especially for high power windows (programme ITER).

The main aspects of activity now are: The development of new methods of measurements; The precise spectroscopy researches of the broad class of solid, liquid dielectrics and metals mirrors reflectivity (programme ITER); Reflectivity investigations of cooled satellite antennas (projects "Hershel", "Plank", "MADRAS", "Millimetron"), satellite antennas for high-temperature (project "BEPI COLOMBO"), ground based telescopes (projects "SUFA", "ALMA");

Real atmosphere absorption investigation (including continuum) for development of precise atmosphere propagation models.

The latest achievement is the creation of unique MM/SubMM-wave resonator spectrometer for the metal reflectivity investigation and dielectric absorption at LH temperatures;

The first observation of resolved rotational spectrum of water dimer at equilibrium.

Projects and Grants awarded:

Principal Investigator of the Projects in the framework of Russian State Programs in Science and Technology, including:

"Development of Technology of Precise Measurements of Dielectric Properties in Microwave Bands" (the State Program "Physics of Microwaves").

"The Meter of Low Absorption in Dielectrics in MM and SubMM Wave Bands" (the State Program "Construction of Scientific Apparatus").

"Development of Super-High Resolution Methods of SubMM Spectroscopy" (the State Program "Quantum and Non-Linear Processes").

INTAS project: "Mechanisms of Millimeter Wave Losses in Diamond and Diamond-Like Materials".

Principal Investigator and Co-Investigator of ~20 Grants of "Russian Fund of Fundamental Research" including joint Russian-Chinese projects supported by the RFBR and the National Natural Science Foundation of China (NNSF):

Dr. V.V. Parshin has ~ 320 scientific publications;

Presentations in recent 20 years (including ~22 Invited Talks) at more than 35 International Conferences in Europe and USA.