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High Frequency Single Mode Traveling Wave Structure for Particle Acceleration

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The new high frequency traveling wave structure with single TM01 slow mode is studied. The structure is composed of a metallic tube with an internally coated low conductive thin layer. It is shown that the impedance of the internally coated metallic tube (ICMT) has a narrow-band single resonance at a high frequency. The resonant frequency corresponds to synchronous TM01 mode excited by the relativistic charge. The dispersion properties of the fundamental and high order modes of ICMT structure are analyzed. Proof-of-principle experimental setup at AREAL facility is given. The potential of the new structure for the particle acceleration and generation of monochromatic radiation in THz region are discussed.

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