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Quasi-Coherent Radiation from a Train of Electron Bunches Inside a Waveguide Partially Filled with Dielectric

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We investigate the quasi-coherent radiation from a train of electron bunches moving along the axis of a cylindrical waveguide, assuming that a part of the waveguide is filled with a material. For the dielectric permittivity of the latter the general case of dispersion is considered. It is shown that under certain conditions on the dielectric function of the medium and the values of the problem parameters, the waveguide modes become equidistant. As a consequence, quasi-coherent Cherenkov radiation from the train of bunches may be generated on several waveguide modes simultaneously. A visual explanation of this phenomenon is provided.

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