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## \* Impedance-induced collective beam instabilities with elliptical beam pipe

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Within the ultrarelativistic limit, the impedance is investigated for the elliptical beam pipe with finite thickness. Fielding matching method is used to determine the electromagnetic fields in different layers. Additionally, numerical results are given to show the behavior of the longitudinal and transverse wake function or its corresponding impedance. The transverse tune shifts induced by the dipolar and quadrupolar impedance of the finite thick elliptical beam pipe are also investigated. The influence of the wall thickness on the impedance and collective beam instabilities are discussed.

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