

Abstracts

A whispering gallery mode sapphire resonator with semi-spherical enclosure

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A new ultra-stable sapphire resonator combined with a specially designed enclosure with semi spherical sidewall is presented and modeled by mode matching method. Stair steps are used to approximate the semi spherical sidewall to simplify the modeling procedure. The characteristic equation of the sapphire resonator can be obtained by solving the discontinuities of the cylindrical region and the spherical region. Resonant frequency, field distribution and unloaded Q of the resonant mode are obtained. Accurate and reliable results of the resonator can be obtained. Good separation of a whispering Gallery mode is obtained by optimizing the structure dimensions.

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