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Modified Fresnel Laws for Optical Microcavities[1] D. GAGNON, G. PAINCHAUD-APRIL, J. POIRIER, L.J. DUBÉ, Laval University, Quebec (Canada) — The scattering of waves at a planar interface between two dielectric media is governed by Fresnel laws. The associated Fresnel coefficients exhibit a discontinuity at the critical angle of incidence, χ_c, resulting in total internal reflection for $\chi \geq \chi_c$. However modern microresonators are often so small that corrections to the planar approximation become necessary. For instance, a plane wave incident on a curved interface can escape the optically denser medium even for angles larger than χ_c. In the spirit of Snyder and Love [1], we have derived *smooth* reflection and transmission coefficients. Interface curvature is accounted for by only modifying the wavefunction describing propagation in the less optically dense medium. The theory is applied to dielectric cavities and our results compared to those of an independent calculation obtained from a sequential-reflection model [2]. The advantages and limitations of our alternative approach will be discussed at the conference.

[1] A. W. Snyder and J. D. Love, *IEEE Trans. Microwave Theory Tech.*, **23**, 134–141, 1975.
[2] M. Hentschel and H. Schomerus, *Phys. Rev. E.*, **65**, 045603(R), 2002.

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