Diffraction Model of a Step-Out Transition[*],
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diffraction model of a cavity, suggested by Lawson, Bane and Sands, is generalized to a step-out transition. Using this model, the high frequency impedance is calculated explicitly for the case that the transition step is small compared with the beam pipe radius. In the diffraction model for a small step-out transition, the total energy is conserved, but, unlike the cavity case, the diffracted waves in the geometric shadow and the pipe region, in general, do not carry equal energy. In the limit of small step sizes, the impedance derived from the diffraction model agrees with that found by Balakin, Novokhatsky and also Kheifets. This impedance can be used to compute the wake field of a round collimator whose half aperture is much larger than the bunch length, as existing in the SLC final focus.