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The effect of quantum evaporation of dark matter halos[1] M.V. MEDVEDEV, University of Kansas — What happens to a particle trapped in a gravitational potential? The answer is obvious: it will remain gravitationally bound forever. In this talk show this is not quite true for a quantum particle. We demonstrate that a stable, trapped particle with flavor mixing can gradually and irreversibly escape – or "evaporate" – from it. This effect is due to mass eigenstate conversions which occur in interactions (scattering) of mass states with other particles even when the energy exchange between them is vanishing. The evaporation and conversion are quantum effects not related to flavor oscillations, particle decay, quantum tunneling or other well-known processes. Apart from their profound academic interest, these effects should have tremendous implications for cosmology. We demonstrate that the flavor-mixed dark matter model can simultaneously explain two outstanding problems of cosmology, namely (1) the absence of central cusps in dark matter halos deduced from observations and (2) the much smaller number of dwarf halos than the CDM prediction known as the sub-structure problem. We also mention the cosmic neutrino background distortion prediction.

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