PULSATIONS OF EÖTVÖS SPHERES

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Abstract. A derivation of Eötvös spheres and their pulsations is presented. These spheres incorporate a short range force in their gravitational potential. We used a Yukawa formulation to agree with other workers in this field, although a slightly different form would guarantee a gravitational force that is always attractive. Various relationships are obeyed by these obejcts, much like the polytropes to which they are similar. An attempt is made to test whether a short range force can resolve two outstanding problems in astrophysics. These are the Cepheid mass discrepancy and the frequencies of high-order solar p-modes. The disagreement in predicted and observed Cepheid masses cannot be explained by a repulsive force, but the solar p-modes have their asympotoic frequency decreased. Linear fits to sequences of models are presented for the radial eigenfrequencies and asymptotic frequencies for nonradial pulsations.