

1) Tuning the  $\alpha - \alpha$  potential at low energies using phase-shift and resonance data constraints  
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We review here the present knowledge on the  $\alpha - \alpha$  potentials existent in the literature in light of the elastic phase-shifts data at energies  $\leq 1.5$  MeV and the resonant states for  $L = 0, 2$  and  $4$ . We propose new types of gaussian potentials that provide a better description of the phase-shift data and independently the resonances observed in the  $\alpha - \alpha$  scattering.