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Most charming dibaryon near unitarity

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A pair of triply charmed baryons, $\Omega_{ccc}\Omega_{ccc}$, is studied as an ideal dibaryon system by (2+1)-flavor lattice QCD with nearly physical light-quark masses and the relativistic heavy quark action with the physical charm quark mass. The spatial baryon-baryon correlation is related to their scattering parameters on the basis of the HAL QCD method. The $\Omega_{ccc}\Omega_{ccc}$ in the 1S_0 channel taking into account the Coulomb repulsion with the charge form factor of Ω_{ccc} leads to the scattering length $a_0^C \simeq -19$ fm and the effective range $r_{\text{eff}}^C \simeq 0.45$ fm. The ratio $r_{\text{eff}}^C/a_0^C \simeq -0.024$, whose magnitude is considerably smaller than that of the dineutron (-0.149), indicates that $\Omega_{ccc}\Omega_{ccc}$ is located in the unitary regime.

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