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3D dimeron as a stable topological object[1] SHIJIE YANG, YONGKAI LIU, Beijing Normal University — Searching for novel topological objects is always an intriguing task for scientists in various fields. We study a new three-dimensional (3D) topological structure called 3D dimeron in the trapped two-component Bose-Einstein condensates. The 3D dimeron differs to the conventional 3D skyrmion for the condensates hosting two interlocked vortex-rings. We demonstrate that the vortex-rings are connected by a singular string and the complexity constitutes a vortex-molecule. The stability is investigated through numerically evolving the Gross-Pitaevskii equations, giving a coherent Rabi coupling between the two components. Alternatively, we find that the stable 3D dimeron can be naturally generated from a vortex-free Gaussian wave packet via incorporating a synthetic non-Abelian gauge potential into the condensates.

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