

# The equation of state of the neutron stars with the $d^*(2380)$ degree of freedom in a hadronic molecular picture

The WASA-at-COSY Collaboration has confirmed the discovery of  $d(2380)$ . *This particle has  $J^P = 3^+$  quantum number and can be identified as an exotic hadron with an unknown internal structure. Several candidates are proposed for its existence, such as hexaquarks, molecular states, dynamically generated resonances, or kinematic effect (triangle singularity).* This work will consider that the  $d(2380)$  is the hadronic molecule composed of the Delta baryon ( $J^P = 3/2^+$ ) bound state. The Weinberg compositeness condition will determine the relevant coupling constants of the Relativistic Mean Field (RMF) Lagrangians involving the  $d^*(2380)$ . The Equation of State (EoS) is also calculated to solve the TOV equation of the neutron stars. Pertinent properties of neutron stars are investigated in our model as well.

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