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Quark Fusion and Magic Numbers for Stability of Quark Compounds AJIT HIRA, JOSE PACHECO, BRIDGET ORTIZ, EDWARDINE FERNANDEZ, MARIO VALERIO, Northern New Mexico College — We continue our work on the investigation of the properties of quarks, antiquarks and of quark-antiquark compounds with this theoretical paper on quark fusion, and on search for magic numbers for quark compounds, using some Python and Fortran codes that we developed. The fusion of b quarks from gluon splitting and sea-quark distributions at the LHC is vital for testing heavy Z0 models where the Z0 boson preferably couples to quarks in the third generations. We formulate a heavy-quark distribution function to combine the processes $QQ \rightarrow H$ and $gQ \rightarrow HQ$ with the process $gg \rightarrow QQH$, and obtain a cross section with potentially large logarithms, of order ln(mH/mQ) summed to all orders in the strong coupling scenario. For the multi-quark systems, the wave functions were first analyzed by group-theoretical techniques, with the antiquark having infinite mass and the quarks belonging to a multiplet. We also describe some possible laboratory experiments that may be used in testing our computational results.

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