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Abnormal solutions with massive exchanges

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We will summarize the main properties of the so called "abnormal solutions"of the Wick-Cutkosky model [1, 2], i.e. scalar particles interacting via massless exchange, within the Bethe-Salpeter equation [3]. These solutions have the property of not existing in the non-relativistic limit, despite of having very small binding energies, and present a genuine many-body character with a vanishing two-body norm in the zero binding limit. These states have already been obtained and discussed in previous works, including previous LCM [4, 5, 6, 7]
We will present in the LCM 2023 new results concerning the massive exchange case, in particular determine under which conditions it is possible to obtain such peculiar solutions without spoiling the model by tachyonic states (M2 < 0).
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