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### The nature of $a_1(1420)$ and triangle singularity mechanism

We demonstrate that the triangle singularity mechanism would account for the creation of the  $a_1(1420)$  in the invariant mass spectrum of  $\pi^- \pi^- \pi^+$  in the  $\pi^- p$  scattering observed by the COMPASS Collaboration. The same mechanism also accounts for the  $\eta(1405/1475)$  puzzle since its interference will lead to significant changes to the lineshapes and peak positions for the same state when it decays into different channels such as  $K \bar{K} \pi$ ,  $\eta \pi \pi$ , and  $3\pi$ . The property of its isospin-0 partner  $f_1(1420)$  is also driven by the same mechanism.

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