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## $X(3872)$ production in high energy heavy ion collisions

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We determined the production cross sections of the  $X(3872)$  state in the reactions  $DD \rightarrow \pi X$ ,  $D^- * D \rightarrow \pi X$  and  $D^- * D^* \rightarrow \pi X$ . We construct a formalism considering  $X$  as a molecular bound state of  $D^- * D^* 0 - c.c.$ ,  $D - D^* + - c.c.$  and  $D - s D^* + s - c.c.$ . To obtain the amplitudes related to these processes we have made use of effective field Lagrangians. We have evaluated the cross section for the reaction  $D^- * D \rightarrow \pi X$ , and find that the diagrams involving the  $X D^- * D^*$  vertex give a large contribution. We also estimate the  $X D^- * D^*$  coupling, which turns out to be  $1.95 \pm 0.22$ . We then use it to obtain the cross section for the reaction  $D^- * D^* \rightarrow \pi X$  and find that, in this case too, the  $X D^- * D^*$  vertex is relevant. We also discuss the role of the charged components of  $X$  in the determination of the production cross sections.

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