Studies of the X(3872) ALEXANDRE RAKITINE, MIT, CDF COLLABORATION — We investigate the puzzling nature of the state $X(3872)$ using data obtained with the CDF II detector at the Fermilab Tevatron Collider. The shape of the dipion mass spectrum in $X(3872) \rightarrow J/\psi \pi^+\pi^-$ decay is compared to theoretical predictions for the dipion spin-parity $0^{++}$ and $1^{--}$. For $0^{++}$ case, the QCD multipole expansion for charmonium is used, and only $^3S_1$ state is found to be compatible with data. There is, however, no $^3S_1$ charmonium state available for assignment to the $X(3872)$. For the $1^{--}$ case the hypothesis $X(3872) \rightarrow J/\psi \rho^0$ is tested and found to be compatible with the data.

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