



MEETING OF THE AMERICAN PHYSICAL SOCIETY DIVISION OF PARTICLES AND FIELDS

Contribution ID: 183

Type: **Presentation**

## Precise measurements of the mass differences between the $D^*(2010)^+$ , and the $D^+$ and $D^0$ mesons with the BaBar detector

*Tuesday, 1 August 2017 14:39 (18 minutes)*

We present a high precision measurement of the mass difference between the  $D^*(2010)^+$  and  $D^+$  mesons using the decay chain  $D^*(2010)^+ \rightarrow D^+\pi^0$ , with  $D^+ \rightarrow K^-\pi^+\pi^+$ . The analysis has been performed on a data sample corresponding to an integrated luminosity of about  $477 \text{ fb}^{-1}$ , collected with the BaBar detector at the PEP-II e+e- collider. We additionally combine this result with a previous BaBar measurement of  $m(D^*(2010)^+) - m(D^0)$  to extract the mass difference between the charged and neutral  $D$  mesons. We obtain results that are approximately seven times more precise than the present world averages.

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**Session Classification:** QCD

**Track Classification:** QCD