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Measurement of the CP violation parameter $A\Gamma$ at LHCb with $D^0 \rightarrow \pi^- \pi^+ \pi^- \pi^+$ decays.

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CP violation in the charm sector is predicted to be very small by the Standard Model and so precise measurements represent a low background environment for new physics searches. A sensitive probe is the parameter $A\Gamma$ which measures time-dependent CP violation and has previously been measured with the LHCb detector in two-body D^0 meson decays. D^0 neutral mesons are the only ones where oscillations of an up-type quark can occur, and are sensitive to possible contributions to CP violation through mixing loops. At LHCb the cross section for charm production is very high allowing unprecedented numbers of D^0 decays to be recorded.

I will present prospects of CP violation measurements in the charm sector and, using data collected by the LHCb detector at run I and run II of the LHC, a blinded preliminary result extending $A\Gamma$ to four-body modes will be presented utilising the $D^0 \rightarrow K^- \pi^+ \pi^- \pi^+$ decay as a control channel.

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Session Classification: Parallel stream 3