# Isolated Direct Double Photon Production in $\overline{p}p$ collisions at $\sqrt{s}$ = 1.8 TeV with the DØ Detector

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# Abstract of the Dissertation

## Isolated Direct Double Photon Production in $\overline{p}p$ collisions at $\sqrt{s}$ = 1.8 TeV with the DØ Detector

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This thesis reports a measurement of direct double-photon production, $p\overline{p} \rightarrow \gamma\gamma + X$, in $p\overline{p}$ collisions at $\sqrt{s}$ =1.8 TeV with the DØ detector. The data sample corresponds to an integrated luminosity $\int \mathcal{L}dt = 82.36 \pm 4.40pb^{-1}$. We observe 333 double-photon candidate events in the region $|\eta^1| < 1.0, |\eta^2| < 1.0, E_T^1 > 14.0GeV, E_T^2 > 13.0GeV$. This implies a production cross section $\sigma = 8.7 \pm 1.5(stat)^{+2.9}_{-3.4}(syst)pb$, The four differential cross sections, $d\sigma/dE_T^{\gamma}$, $d\sigma/dM^{\gamma\gamma}$, $d\sigma/dP_T^{\gamma\gamma}$ and $d\sigma/d\Delta\phi^{\gamma\gamma}$, are compared to the NLO QCD, the Resummed QCD(RESBOS) and the PYTHIA calculations. At the high $Q^2$ region (corresponding to large $P_T^{\gamma\gamma}$), data agree well with the NLO calculation. At the low $Q^2$ region (corresponding to small $P_T^{\gamma\gamma}$), the data show reasonable agreement with the Resummed QCD calculation.

To Justin, Nathan and My Mother

# Contents

# List of Figures

# List of Tables

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