INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study	:	Ph.D.
Thesis Title:		Study of the $B^0 \to \gamma\gamma$ decay at Belle and Belle II
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We report the result of a search for the rare decay $B^0 \to \gamma\gamma$ using a combined dataset of 753×10^6 $B\bar{B}$ pairs collected by the Belle experiment and 387×10^6 $B\bar{B}$ pairs collected by the Belle II experiment at the $\Upsilon(4S)$ resonance produced in electron-positron collisions. A simultaneous fit to the Belle and Belle II data sets yields $11.0^{+6.5}_{-5.5}$ signal events. We determine the branching fraction $\mathcal{B}(B^0 \to \gamma\gamma) = (3.7^{+2.2}_{-1.8}(\text{stat}) \pm 0.5(\text{syst})) \times 10^{-8}$ with a signal significance of 2.5σ and set a 90% confidence level upper limit of $\mathcal{B}(B^0 \to \gamma\gamma) < 6.4 \times 10^{-8}$. This result improves on the previously published 90% confidence level upper limit by BABAR by a factor of about five and provides the most stringent limit to date.