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The One-loop Two Photon Stau – Neutralino Feynman Diagram Contribution to Co-annihilation KEITH ANDREW, ERIC STEINFELDS, ARMIN SMAILHODZIC, Western Kentucky University — The neutralino is a dark matter candidate arising in the super symmetric extension of the standard model. For the Minimal Super Symmetric Standard Model, MSSM, extension the lightest non-decaying neutral particle can be the neutalino. As a relic particle from cosmic production in the early big bang it should be abundant in galactic halos contributing to anomalous rotation curves. A fraction of the interactions of the neutralinos should annihilate or co-annihilate producing gamma rays that are observable on Earth. The calculation of the branching fraction produces a series of Feynman diagrams that give the cross section and probability for the event to occur. Here we look at the diagram given by the Stau lepton interacting with a neutralino in terms of the Feynman integral at one loop producing a pair of gamma rays. This term should contribute to the galactic dark matter gamma ray flux from the halo. Here we find an analytic expression for one of the co-annihilation cross section terms.

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