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NLO corrections to Higgs to Higgs decay in the xSM

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We study the decay of a heavy Higgs boson into a light Higgs pair at one loop in the singlet extension of the Standard Model. To this purpose, we properly fully renormalized the extended Higgs sector of the model. We applied different schemes to calculate the heavy-to-light Higgs decay width H-> hh at next-to-leading order electroweak accuracy, and demonstrate that certain prescriptions lead to gauge-dependent results. We comprehensively examine how the NLO predictions depend on the relevant singlet model parameters and how these change under different renormalization schemes and a variable renormalization scale. Once all present constraints on the model are included, we find mild NLO corrections, typically of few percent, and with small theoretical uncertainties. This process is of interest since it can affect the pair production of Higgs bosons at run II of the LHC. The subject of this talk has been published in JHEP 1602 (2016) 147.

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