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Searches for the Higgs boson in final states with photons or taus in $p\bar{p}$

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We present the result of two searches for the standard model Higgs boson using the Run 2 data sample collected with the D0 detector at the Fermilab Tevatron collider at a center of mass energy $\sqrt{s}=1.96$ TeV. In the first search the Higgs boson is searched for in final states with two high transverse momentum photons, exploiting in addition to the diphoton invariant mass spectrum a large number of other kinematic variables via a multivariate technique. This search is also interpreted in the framework of fermiophobic Higgs boson models. In the second search we consider final states with a lepton (e or mu), a tau (identified via its hadronic decays), and analyze separately events with no jets, exactly one jet and two or more jets. These different final states are sensitive to all dominant Higgs boson production modes and probe the Higgs coupling to tau leptons.

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