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Explaining the $\gamma\gamma + X$ excesses at 152 GeV via the Drell-Yan production of a Higgs triplet

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The discovery of the 125 GeV Higgs boson marked the final piece of the Standard Model (SM), but no new particles have been observed since. However, multi-lepton anomalies at the LHC hint at a new scalar between 145–155 GeV, decaying mainly to WW, with no corresponding ZZ signal—suggesting a neutral $SU(2)_L$ triplet. Recasting ATLAS Run-2 di-photon data reveals a 4σ excess near 152 GeV and a preferred di-photon branching ratio of $(0.7 \pm 0.2)\%$. If confirmed, this would be the strongest evidence yet for new physics at the LHC.

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