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The Production of a Singlet Scalar at Future e+ e-Colliders

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Motivated by the multi-lepton anomalies, a search for narrow resonances with $S \to \gamma\gamma, Z\gamma$ in association with light jets, b-jets or missing transverse energy was reported in the paper arXiv:2109.02650. The maximum local (global) significance is achieved for $m_S=151.5$ \,GeV with 5.1σ (4.8 σ). In this paper we compute the production cross-section of this scalar candidate in e^+e^- collision by assuming that the couplings to Electro-Weak bosons are loop induced. We find that the cross-section could be large enough for S to be detected at future e^+e^- colliders. The leading production mechanism is $e^+e^- \to Z^\star \to S\gamma$, which offers the opportunity of isolating S through the missing mass method.

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