

## Search for new spin-1 boson using ATLAS detector data

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This paper presents the search for a new spin-1 boson in a four-lepton final state through the channel  $H \rightarrow Z_d Z_d \rightarrow 4l$  where  $Z_d$  is the new spin-1 boson, and  $4l$  could be  $4e$ ,  $4\mu$  or  $2e2\mu$ . This analysis' mass range of the  $Z_d$  probed lies between 15 - 60 GeV. We conducted this search using  $pp$  collision data from the ATLAS detector corresponding to an integrated luminosity of  $139 \text{ fb}^{-1}$  and a centre of mass energy of  $\sqrt{s} = 13 \text{ TeV}$ . We observed no significant deviation from the Standard Model in this analysis. We observed improvements from the previous iteration of the analysis' limits set on the Higgs branching ratio and the fiducial cross-section. We also set limits on the mixing parameter related to the Beyond Standard Model framework used in this analysis.

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