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New Vector Boson Near the Z-pole and the Puzzle in Precision Electroweak Data

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We show that a Z' with suppressed couplings to the electron compared to the Z-boson, with couplings to the b-quark, and with a mass close to the mass of the Z-boson, provides an excellent fit to forward-backward asymmetry of the b-quark and R_b measured on the Z-pole, near the Z-pole and above the Z-pole, and to A_e obtained from the measurement of left-right asymmetry for hadronic final states. It also leads to a significant improvement in the total hadronic cross section on the Z-pole and R_b measured at energies above the Z-pole. In addition, with a proper mass, it can explain the excess of $Zb\bar{b}$ events at LEP in the 90-105 GeV region of the $b\bar{b}$ invariant mass. With additional small flavor violating couplings it can explain the discrepancy in muon $g-2$, and the like-sign dimuon anomaly measured by D0.

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