Excitation Cross Sections, Collision Strengths and Line Ratios of O II\(^1\) MAXIMILIANO MONTENEGRO, SULTANA NAHAR, ANIL PRADHAN, The Ohio State U, WERNER EISSNER, U. of Stuttgart — The forbidden [O II] lines are one of primary density diagnostics in astrophysical sources. We have carried out relativistic Breit-Pauli R-matrix (BPRM) calculations for the non-dipole transitions of interest. The coupled channel target is represented by a 16-level wavefunction expansion dominated by configurations \(2s^22p^3, 2s2p^4, 2s^22p^23s\). Resonances are delineated in detail to ascertain the effect on Maxwellian averaged collision strengths. Results for the forbidden transitions among the lowest 5 levels of the ground configuration \(2s^22p^3\left( ^4S_0^o, ^2D_0^o, ^2P_0^o, ^2P_1^o, ^2P_3^o\right)\) show that the fine structure collision strengths do not significantly depart from values obtained from a purely LS–>LSJ transformation. Present results differ significantly with similar BPRM calculations by McLaughlin and Bell (1998), but are essentially in agreement earlier results of Pradhan (1976). The astrophysically important line ratio \(I(3729)/I(3726)\) derived from the present results is in agreement with the high and low-density limits expected on physical grounds, and with recent observations. The present excitation cross sections for the \(^4S_0^o - ^2D_0^o\) transition shows excellent agreement with measurements from a merged beam experiment (Zuo et al 1995).

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