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Line intensity enhancements in both stellar and laser-plasma coronal X-ray spectra due to opacity effects JUSTIN WARK, University of Oxford, STEVEN ROSE, Imperial College, London, FRANCIS KEENAN, Queen's University Belfast, MICHAIL MATHIOUDAKIS, MARCO MATRANGA, Queen's University, Belfast — The intensity of optically thin transitions increase linearly with optical depth. As one might expect an optically thick line to increase less quickly than linearly, the thick to thin ratio is normally thought to decrease with increasing optical depth. However, for systems in coronal equilibrium, this is not necessarily the case, and this ratio can have enhancements that are a function of plasma geometry and viewing angle. Here we consider the X-ray spectra for a number of late-type active stars, obtained with the Reflection Grating Spectrometer on the XMM-Newton satellite. Both flare and quiescent spectra are considered, and intensity ratios studied which involve the Fe XVII 15.01 Å and 16.78 Å transitions. We consider a large dataset for a number of stars, and in particular the case of EV Lac, where the 15.01 Å line exhibits an enhancement in intensity over the optically thin value, which we interpret in terms of a geometry consistent with a largely planar feature on the surface of the star being observed at an angle of order 45 degrees. We show that such enhancements due to opacity should also be observable in laser-produced plasmas of specific geometry.

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