An Explanation for the "X-ray Baldwin" Effect

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Using our newly developed ionized X-ray reflection code (reported in Nayakshin, Kazanas and Kallman at this meeting), we compute the reflection continuum and the iron lines from an accretion disk illuminated by X-rays. The fact that we self-consistently include the effects of the thermal ionization instability on the pressure and the density structure of the illuminated layer makes our study to be much more sensitive to the geometry of the X-ray producing region(s) and the disk itself than the previous ionized reflection studies were.
In particular, we consider a standard-like accretion disk illuminated by X-rays coming from: (a) a full corona; (b) magnetic flares (patchy corona); (c) a source located at some height above the disk or the black hole (as in the model of Reynolds and Begelman 1997) . We find that models (a) and (c) fail to explain the "X-ray Baldwin effect", and that (c) cannot even produce the typical Seyfert 1 iron line profile. On the other hand, model (b) appears to suggest an explanation for the X-ray Baldwin effect in AGN and is also promising in many other respects.