

Re: First-surface mirrors don't polarize, do they?

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In article <46CECBA5.1090504@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>, Phil Hobbs <pcdh@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx> wrote:

Cheap first surface mirrors are usually 'protected aluminum', which is Al covered with a half-wavelength worth of SiO_2 , which is a nonstoichiometric, silicon-rich oxide whose index can range anywhere from that of SiO_2 (1.46) to about 1.9, depending on the deposition conditions (which change the oxygen content of the film).

Aluminum-air surfaces are much better reflectors than aluminum-glass, so protected aluminum mirrors have quite low efficiencies except where thin film interference in the SiO_2 helps. The thin film interference is polarization sensitive off axis, of course, which makes protected Al mirrors somewhat polarizing.

Better quality aluminum mirrors are usually 'enhanced aluminum', in which the single SiO_2 layer is replaced with a dielectric stack. With more layers, the coating designer has more degrees of freedom, so the off-axis and polarizing performance of enhanced Al is harder to know from first principles.

Yikes. Neither of those sounds good for mirrors intended for use with a variety of wavelengths, 200 to 2500nm in the case of this spectrometer. I suppose actual silver would tarnish. Is it still used?

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