to the convection zone, then the problem can be described essentially in terms of two parameters, the value of the initial magnetic field in the ring, and the effective drag experienced by it (which is related to the radius of the ring). For field strengths at the bottom of the convection zone of order 105 Gauss or less, we find that the coriolis force plays a dominant role and flux rings starting from low latitudes at the bottom get deflected and emerge at latitudes significantly poleward of sunspot zones. This seems to imply that solar flux rings could not have been axisymmetric through most of their rise through the convection zone, contrary to conclusions reached by Schüssler (1979, Astron. Ap., 89, 26).

30.07
A Hillock and Cloud Model for Faculae
K. H. Schatten, H. G. Mayr, K. Omidvar, E. Mather (NASA/GSFC)
We develop a facular model consisting of an uplifted photosphere (a "hillock") plus tenuous photospheric gas (a cloud) ejected into the solar atmosphere in and around flux tubes. This model transports material from a region below sunspots to the surrounding photosphere, thereby preventing the buildup of heat below sunspots, which would destroy them. In this "hillock" model, the appearance of faculae is directly related to the enhanced "ray path gradient", allowing light to "leak out" of the hillocks more rapidly than the unperturbed surface. Facular contrasts are modeled at a variety of wavelengths and different viewing angles. The model provides globally for an enhanced emission, related to the greater surface area that a convoluted surface has compared with a plane. In strong Fraunhofer lines, the hot facular gases (the cloud) above the photosphere are optically thick, providing for the bright plage appearance of active regions throughout their journey across the solar disk. The facular appearance of a protuberance, dropping out from the surface, would also change the Sun's shape when seen from the earth (G. Dicke and Goldenberg, 1967). In our view, sunspot downflows drive facular upflows; these flows tend to carry about equal amounts of internal energy. Such an energy balance appears to be consistent with the views of Chapman (1980), Oster et al. (1982) and Sofia et al. (1982).

30.08
A Spatial Coherence Interferometer Utilizing a Grating and Its Possible Use for Solar Limb Investigations
E. J. Seykora (East Carolina U.)
An exit pupil interferometer consisting of a collimating lens, a low dispersion grating, and a transform lens arranged in a collinear geometry is discussed. The image of a point, limb, or extended source with a sharp edge is collimated and the resultant partially coherent beam directed to the grating initially placed at the object plane of the transform lens. This results in a real image of the grating in the image plane of the transform lens. For a fixed image plane it is shown that the image of the grating periodically appears and disappears as the grating is moved from the object plane of the transform lens. The grating image appears, for grating distances \( r \) measured from the object plane of the transform lens, at \( r = n \lambda^2/2d \), where \( d \) is the grating center to center line separation, \( \lambda \) the wavelength, and \( n \) an integer. Furthermore, the grating visibility, for increasing \( n \), is shown to be a measure of the lateral spatial coherence of the input image at the collimating lens. Methods of recording the grating visibility or spatial coherence which also minimizes the perturbations from atmospheric seeing will be discussed.

Session 31: Neutron Stars, Pulsars, Radio, and X-Ray
2:25-4:05 (Room 220)
31.01
On the Secular Instability of Neutron Stars to Gravitational Radiation Reaction and Viscosity
R.A. Managan (U. of Toronto)
The secular instability due to gravitational radiation reaction is studied. Recently Lindblom has derived a method to estimate for a neutron star the critical angular velocity where it becomes secularly unstable to gravitational radiation reaction as moderated by viscosity. This critical angular velocity is the upper limit on the rotation rate of the neutron star. To arrive at this estimate Lindblom combined quantities calculated from spherical neutron star models with properties of the \( n = 0 \) polytropic sequence. His results are compared to the estimates derived when properties of the \( n = 1 \) and the \( n = 1.5 \) polytropic sequences are used instead of those of the \( n = 0 \) polytropic sequence. Most of the change in the critical angular velocity is due to the change in the angular velocity dependence of the frequency of the secularly unstable mode. Overall, the difference between using a sequence from a rotating neutron star by an \( n = 1 \) polytropic sequence instead of an \( n = 0 \) sequence is to lower the estimates of the critical angular velocities by about 5 - 10%. However, the critical angular velocities depend more strongly on the equation of state and the mass of the neutron star than on the polytropic index used for