1172-85-90 **Alexander M Balk*** (balk@math.utah.edu), UT. *Dynamo and the Adiabatic Invariant.*

Magnetic field of a planet or star often crucially depends on the shallow fluid layer (e.g. Sun's tachocline or Earth's stratified ocean of the core). The talk considers dynamo generated by such layer.

We linearize this dynamics on the background of strong toroidal magnetic field B_0 and note the possibility to separate variables for an arbitrary stratification. This leads to the quadratic dispersion relation, characterized by two length scales: $r = \sqrt{gh}/f$ & $\ell = \sqrt{B_0/\beta}$. The scale r characterizes the usual Rossby waves without magnetism; f is the local angular speed; the height h is determined by the eigen-value problem resulting from the separation of variables. The scale ℓ characterizes the strength of the magnetic field B_0; β is the latitudinal derivative of f. We notice that in each of the two cases (Earth and Sun), these scales are similar. If $\ell = \mathsf{r}$ exactly, the quadratic dispersion relation can be factorized.

We use the adiabatic invariant with spectral density

$$\eta = \arctan\frac{q + p\sqrt{3}}{rk^2} - \arctan\frac{q - p\sqrt{3}}{rk^2} \quad [\mathbf{k} = (p, q) \text{ is the wave vector}]$$

to show the energy accumulation in zonal magnetic field, and so, the background field B_0 is maintained. (Received August 18, 2021)