SOUND WAVE IMPLEMENTATION IN THE VORTICITY

The parallel thermal velocity is included in the parallel component of the Vorticity definition:

$$U = \frac{1}{\rho}\frac{\partial}{\partial \rho}\left[\rho_m \rho \sqrt{g}\left(g_{\rho\theta}v^{\rho} + g_{\theta\theta}v^{\theta} + g_{\theta\zeta}v^{\zeta} + g_{\theta\zeta}v_{th,\|}{}^{\zeta}\right)\right] - \frac{1}{\rho}\frac{\partial}{\partial \theta}\left[\rho_m \sqrt{g}\left(g_{\rho\rho}v^{\rho} + g_{\rho\theta}v^{\theta} + g_{\rho\zeta}v^{\zeta} + g_{\theta\zeta}v_{th,\|}{}^{\zeta}\right)\right]$$

new terms added:

$$U = \ldots + \frac{1}{\varepsilon}\frac{1}{\rho}\frac{\partial}{\partial \rho}\left[\rho_m \rho \sqrt{g} g_{\theta\zeta}\right] v_{th,\|}{}^{\zeta} + \frac{\rho_m}{\varepsilon}\sqrt{g} g_{\theta\zeta}\frac{\partial v_{th,\|}{}^{\zeta}}{\partial \rho} - \frac{1}{\varepsilon}\frac{1}{\rho}\frac{\partial}{\partial \theta}\left[\rho_m \sqrt{g} g_{\rho\zeta}\right] v_{th,\|}{}^{\zeta} + \frac{\rho_m}{\varepsilon}\sqrt{g} g_{\rho\zeta}\frac{1}{\rho}\frac{\partial v_{th,\|}{}^{\zeta}}{\partial \theta}$$

Implementation:

```
do l=1,lmax
        wk7(:,l)=r*denseq*wk5(:,l)/eps
end do
call dbydr(wk8,wk7,0.0_IDP,1.0_IDP,2)
do l=1,lmax
        wk7(:,l)=denseq*wk4(:,l)/eps
end do
call dbydth(wk9,wk7,-1,0.0_IDP,1.0_IDP,0)
do l=1,lmax
        wk7(:,l)=rinv*wk8(:,l)-wk9(:,l)
end do
call mult(ss,wk7,1,vthprlf,-1,1.0_IDP,1.0_IDP)

do l=1,lmax
        wk7(:,l)=denseq*wk5(:,l)/eps
end do
call dbydr(wk8,vthprlf,0.0_IDP,1.0_IDP,0)
call mult(ss,wk8,-1,wk7,1,1.0_IDP,1.0_IDP)
do l=1,lmax
        wk7(:,l)=-denseq*wk4(:,l)/eps
end do
call dbydth(wk8,vthprlf,-1,0.0_IDP,1.0_IDP,0)
call mult(ss,wk8,1,wk7,-1,1.0_IDP,1.0_IDP)
```