Figure 5. Gravitational and gravito-magnetic forces between two massive bodies

Gravitational and gravito-magnetic forces on two masses a distance ( $x$ ) apart both moving with a velocity ( $v$ ) and at a distance ( $r$ ) from a central comoving observer.
Gravito-magnetic

Force $\left(F_{\text {gravmag }}\right)$ | Body (with |
| :--- |
| mass $\mathrm{m}_{1}$ ) |



X


Cosmological radius
$v=H r$ (where $H$ is Hubble's constant)

Body (with mass $\mathrm{m}_{2}$ )

Gravito-magnetic Force ( $F_{\text {gravmag }}$ )
$F_{\text {grav }}-F_{\text {gravmag }}=\frac{\left(1-\frac{v^{2}}{c^{2}}\right)^{\frac{1}{2}} m_{1}\left(1-\frac{v^{2}}{c^{2}}\right)^{\frac{1}{2}} m_{2}}{4 \pi \varepsilon x^{2}}$

As the velocity ( $v$ ) approaches the speed of light (c), the resultant force on each mass ( $F_{\text {grav }}-F_{\text {gravmag }}$ ) approaches zero.

