Comparison of Electric and Gravitational Fields

Similarities

Concept	Gravitational Fields	Electric Fields
What do they affect?	All masses	All charges
Force	$F = -\frac{GMm}{r^2}$ $[F] = [\mathrm{N}]$	$F = \frac{Qq}{4\pi\varepsilon_0 r^2}$ $[F] = [\mathrm{N}]$
Field Strength	$g = \frac{F}{m} = -\frac{GM}{r^2}$ $[g] = [\mathrm{Nkg^{-1}}]$	$E = \frac{F}{q} = \frac{Q}{4\pi\varepsilon_0 r^2}$ $[E] = [\mathrm{NC^{-1}}]$
Potential (around a point source)	$V_{\mathrm{grav}} = \frac{W}{m} = -\frac{GM}{r}$ $[V_{\mathrm{grav}}] = [\mathrm{Jkg^{-1}}]$	$V_{\mathrm{elec}} = \frac{W}{q} = \frac{Q}{4\pi\varepsilon_0 r}$ $[V_{\mathrm{elec}}] = [\mathrm{Volts}] = [\mathrm{JC^{-1}}]$
Field is zero only at…	∞	∞
Equipotentials are lines connecting points of equal…	…gravitational potential	…electrical potential
Field lines are lines of…	…gravitational force (*the direction a small test mass would move if placed at that point*)	…electrical force (*the direction a small positive test charge would move if placed at that point*)
Radial fields are created around…	…point and spherically symmetrical masses	…point charges and spherically symmetrical charged bodies
Uniform fields are found…	…near large spherical masses (approximation)	…near large spherical charged bodies (approximation) and between oppositely-charged parallel plates.

Differences

Gravitational Fields	Electric Fields
Are only ever attractive	Can be attractive or repulsive
It is impossible to shield an object from gravitational fields.	An Earthed solid metal container or grid/cage* will have no field inside it.
Very weak, unless huge masses are involved.	Can be very strong, especially within an atom.

* This is sometimes called a Faraday cage, and can be used to protect people/electronics etc. from damage by electric/electromagnetic fields, lightning bolts etc. What sort of mobile phone reception would you expect to get inside a Faraday cage? Is it particularly safe or unsafe to be in a car during a lightning storm?