

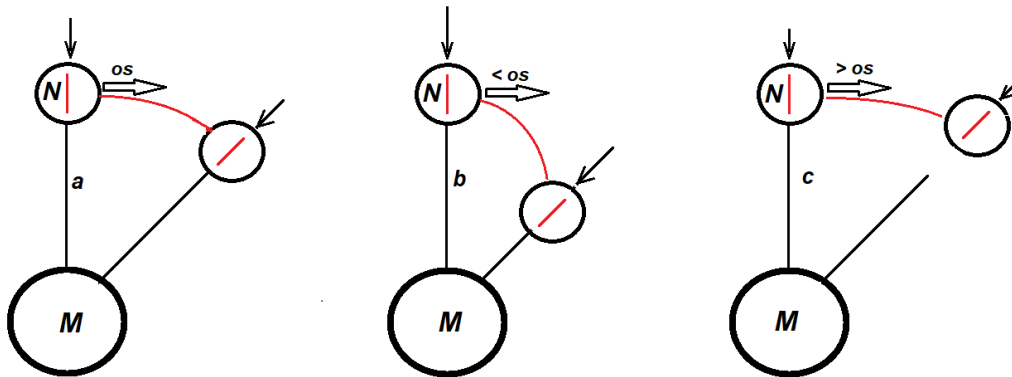
Motion through gravitational field lines

A gravitational field line is a straight gravitational direction of force towards the source of the field.

Let M be a much larger mass than N so we only consider the effects of M 's field on N . Like a rotating rope attached to a ball, M 's gravitational direction of its force from N 's point of view rotates as N passes by laterally, causing rotation of motion. N will fall (drop) from its horizontal position as its direction of motion rotates.

Since the gravitational force is a constant value at each distance r , there is only 1 lateral speed at each r (in either opposing direction) that will generate the correct drop and rotation to maintain an orbital pathway.

Fig 1 deviation of motion os – orbital speed

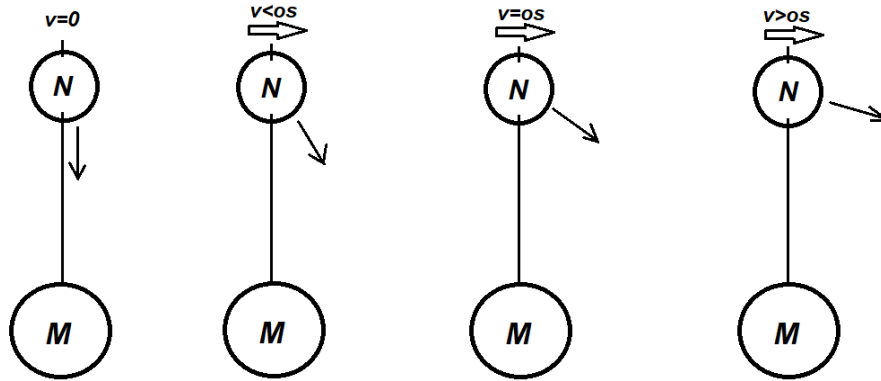


- 1- **a** - N is at orbital speed. The speed of N determines the amount of time N spends crossing a field line as well as the turn rate. This produces the correct drop (from the initial horizontal position) and turn that maintains N in its **cw** orbital pathway. Every gravitational field line that is crossed turns N into the orbital path.
- 2- **b** - When the speed of an orbiting object is reduced to below orbital speed, more time is spent under the gravitational force as the field line is being crossed. More inward drop into the rotating field line will occur causing inward deviation from the orbital path.
- 3- **c** - When the speed of an orbiting object is above orbital speed, less time and hence less drop occurs from the initial horizontal position as N traverses the field line. Outward deviation from the orbital path occurs.
- 4- Lowering speeds will cause inward deviation.
- 5- Increasing speeds will cause outward deviation.

Adjacent direction

Adjacent direction is defined as the direction of **N** immediately after it has crossed a gravitational field line.

Fig 2 adjacent directions as determined by speed through a field line



Increasing lateral speed of **N** will deviate its adjacent direction outward from direction of motion.

Decreasing lateral speed of **N** will deviate its adjacent direction inward from direction of motion.

Motion of gravitational field lines through the **N** body

Fig 3 change of viewpoint - adjacent direction as determined by a bypassing field line

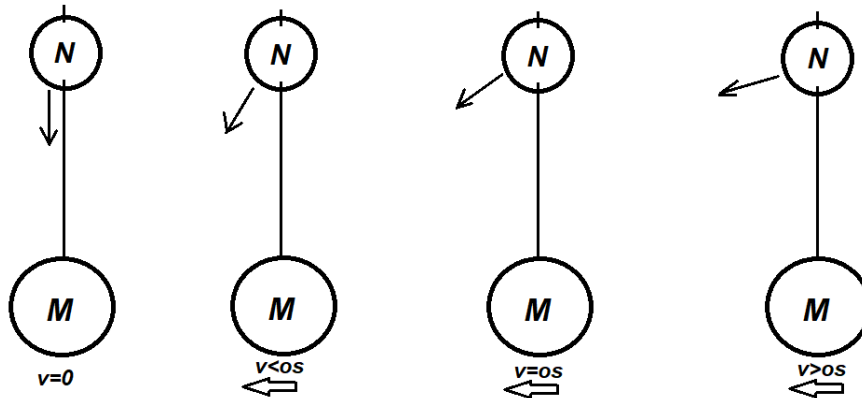


Fig 2 and 3 are one and the same as we have only changed our viewpoints.

Increasing lateral speed of the source of the field (**M**) will deviate **N**'s adjacent direction outward from direction of **M**'s motion.

Decreasing lateral speed of the source of the field (**M**) will deviate **N**'s adjacent direction inward from direction of **M**'s motion.

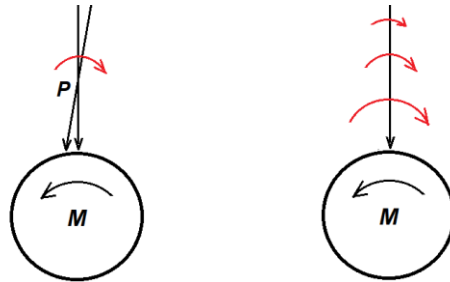
Space around a ccw spinning M

If a moving mass produces rotational gravitational field lines perpendicular to direction of motion, then does a spinning mass (M) produce perpendicular rotational field lines around the whole circumference surrounding itself?

The turn of motion that a gravitational field line imparts on N is caused by the changing direction of the gravitational force.

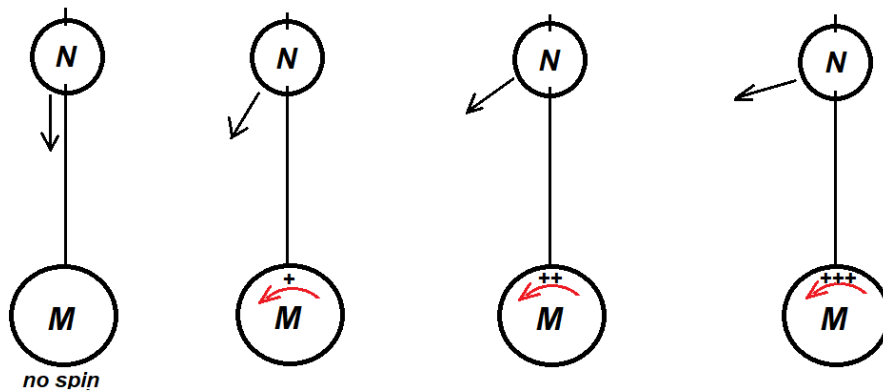
Is the affect of a directional changing perpendicular field line above a spinning M , the same as a field line above M as it is passing by from below? Though this field line may be envisioned to be stationary, from a point above a spinning M body, the direction of the gravitational field line is in rotation.

Fig 4 From point P , the perpendicular field line above a **ccw** spinning M is in **cw** rotation



The rate of rotation decreases as the distance is increased.

Fig 5 Adjacent direction as determined by spin of the source of the field line (M)



With N initially in inward fall, increasing **ccw** spin of the source of the field (M) will deviate N 's adjacent direction **ccw** in the opposite rotation of M 's spin.

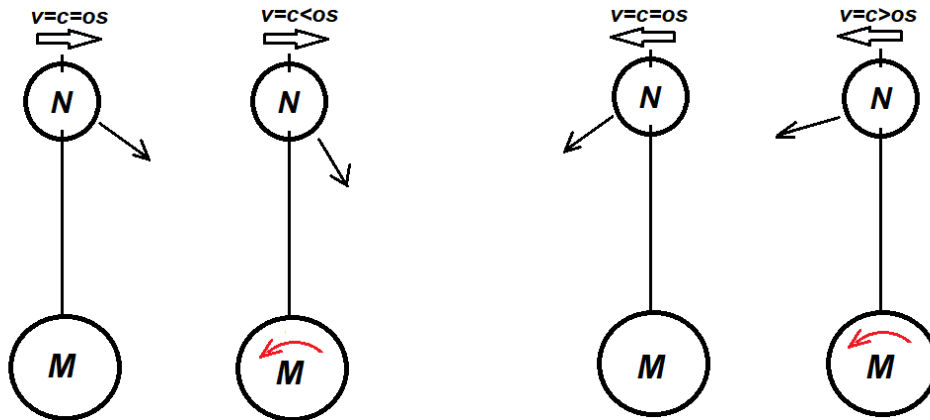
Decreasing **ccw** spin of the source of the field (M) will deviate N 's adjacent direction **ccw** in the same rotation of M 's spin.

The rate of rotation increases because the point of rotation is moved up the gravitational field line, thereby shortening the radius of turn.

Orbits around a ccw spinning M

If lateral motion through a gravitational field line determines the rate of rotation, which affects the rate of turn, then the same lateral motion through a field line that is already undergoing rotation will further alter the rate of turn.

Fig 6 Lateral movements through perpendicular gravitational field lines at distance r



- 1- As N orbits cw at distance r around a non-spinning M , its rate of turn matches the rotation rate of the orbit. There is no deviation from the orbital pathway.
- 2- Adding ccw spin to M increases the cw rate of gravitational directional change, thereby increasing N 's cw rate of turn causing its adjacent direction to deviate cw and inwards.
- 3- To maintain an orbital pathway, N 's speed must be increased to offset deviation.
- 4- Orbits aimed in the opposite direction of spin are faster.
- 5- When N is orbiting ccw , adding ccw spin to M decreases ccw rate of gravitational directional change, thereby decreasing N 's ccw rate of turn and causing its adjacent direction to deviate cw and outwards.
- 6- To maintain an orbital path, N 's speed must be decreased to offset deviation.
- 7- Orbits aimed in the same direction of spin are slower.
- 8- The added effects on turn rate by M 's spin diminishes as r is increased.

Differences from the higher to lower orbits, in opposite direction of spin, tend to diverge, with greater gain in speeds towards the lower orbits.

Differences from the higher to lower orbits, in the same direction of spin, tend to converge, with greater loss of speeds towards the lower orbits.

The orbiting speeds measured by height that orbit in the same direction of a spinning mass will show a flatter rotation curve.

As **N** passes through a gravitational field line its lateral motion is curved downward. We will call this **curvature turn**.

Increasing the curvature turn

- 1- Increase the force
- 2- Decrease the speed
- 3- Reduce the distance (increasing the spin of the gravitational source has this affect)

Decreasing the curvature turn

- 1- Decrease the force
- 2- Increase the speed
- 3- Increase the distance (decreasing the spin of the gravitational source has this affect)