Physics - Gravitation

Topics : Computer engineering
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1. **Gravitation:**
    - Gravitation is the natural force by which objects with mass attract one another.
2. **Newton's Law of Universal Gravitation:**
    - Every particle in the universe attracts every other particle with a force directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers.
    - Mathematically expressed as F = G * (m1 * m2) / r^2, where F is the gravitational force, G is the gravitational constant, m1 and m2 are the masses of the objects, and r is the distance between their centers.
3. **Gravitational Field:**
    - A region around a massive object where another object with mass experiences a gravitational force.
    - Gravitational field strength (g) at a point is the force per unit mass experienced by a small test mass placed at that point.
4. **Kepler's Laws of Planetary Motion:**
    - Three laws describing the motion of planets around the Sun, including laws of orbits, areas, and periods, defining the shape, speed, and timing of planetary orbits.
5. **Gravitational Potential Energy:**
    - Energy stored in an object due to its position in a gravitational field.
    - Given by U = - (G * m1 * m2) / r, where U is the gravitational potential energy, G is the gravitational constant, m1 and m2 are the masses of the objects, and r is the distance between their centers.
6. **Escape Velocity:**
    - Minimum velocity required for an object to escape the gravitational pull of a massive body without additional propulsion.
    - Calculated as v_e = sqrt(2GM / r), where v_e is the escape velocity, G is the gravitational constant, M is the mass of the body, and r is the distance from its center.