

# [Nuclear force essay](https://assignbuster.com/nuclear-force-essay/)

Nuclear Force The atomic nucleus contains a mix of protons and neutrons. The electrons are arranged around the nucleus. We already know that the protons have a positive charge and they have to repel each other because of Coulomb’s law: If the protons have to repel each other why it doesn’t happen? Answer is the NUCLEAR FORCE. So, the nuclear force is the force that holds nucleons (protons and neutrons) together in a nucleus. Properties of the Nuclear Forse: The nuclear force is strongest force in nature and 100 times stronger than electrostatic force. That’s why nucleus is stable and do not disintegrate.

The nuclear force is short range force. It means that it exist only when nucleons are extremely close (10-15 m) between each other. 3. Nuclear forces are not central forces. It means that these forces do not depend upon the centre of one particle to another particle. Nuclear forces do not depend upon the charge on the nucleons. The force is so strong that it can holds protons (with charge) together. Otherwise, they must repel each other because they have to have the negative and the positive charge to be together. Strong Nuclear Force and Weak Nuclear Force Differences: Particles that are responsible for carrying the strong force are massless, whereas for the weak force they are quite massive (nearly 100 times the proton mass). This explains why the weak force is weak – it is hard to borrow that much mass-energy for long enough to propagate very far. – Another difference is that the strong force actually gets weaker as you go up in energy, whereas the weak force gets stronger – at very high energy they should have the same strength. Similarities: – Both one of the four fundamental forces that governs how the universe works – Both work at a subatomic level Both have a very short range Nuclear Fission If we have the nuclear force, also, we have the energy. This energy called the Binding energy. Binding energy is the energy used to hold a nucleus together. Moreover, this energy is the amount of energy that would be needed to separate the nucleus. The Binding energy equation is For example, uranium-235 can be split into krypton-92, barium-141, energy and neutrons. The neutron interacts with uranium-235, the neutron transfers the energy to uranium-235 and if this energy more then binding energy you can see splitting the uranium atom:

The equation for this nuclear reaction is So, the decomposition of large, unstable nuclei into smaller is called nuclear fission. Uses of Nuclear Fission: 1. The energy released by the fission that takes place in a nuclear reactor of the nuclear power plant is converted and generated into electricity. In this process, nuclear energy is transformed into thermal energy, which heats water and turns it into steam. The high-pressure steam passes through pipes and turns the blades of a turbine, which is connected to an electricity generator.

The electricity generator produces current electricity that is distributed through a large network of wires called the power grid. Nuclear weapon A nuclear weapon is an explosive device that derives its destructive force from nuclear reactions, either fission or a combination of fission and fusion. Nuclear Fusion Nuclear fusion is the opposite process of nuclear fission. In order for nuclear fusion to occur, the fusing nuclei must have enough kinetic energy to overcome the repulsive electrostatic force (the Coulomb barrier) between them.

How to get a high energy level between them? We have to increase the temperature. Then nuclei will collide because they will have enough energy after that. So, nuclear fusion is a nuclear reaction in which the nuclei of two atoms fuse together to form a large nucleus with uses of high temperature. For example, nuclear fusion of deuterium with tritium creating helium-4, freeing a neutron, and releasing 17. 59 MeV of energy, as an appropriate amount of mass changing forms to appear as the kinetic energy of the products, in agreement with kinetic E = ? c2, where ? m is the change in rest mass of particles. The equation for this nuclear reaction is Uses of Nuclear Fusion: Fusion power Fusion power is the power generated by nuclear fusion processes. 2. Thermonuclear weapon A thermonuclear weapon is a nuclear weapon design that uses the heat generated by a fission bomb to compress and ignite a nuclear fusion stage. Works cited www. answers. yahoo. com/question/index? qid= 20110910114050AAYUhfg www. buzzle. com/articles/uses-of-nuclear-energy. html www. en. wikipedia. org/wiki/Fusion\_power www. n. wikipedia. org/wiki/Nuclear\_force 5. www. en. wikipedia. org/wiki/Nuclear\_power 6. www. en. wikipedia. org/wiki/Nuclear\_weapon 7. www. en. wikipedia. org/wiki/Thermonuclear\_weapon 8. www. en. wikipedia. org/wiki/Weak\_interaction 9. www. in. answers. yahoo. com/question/index? qid= 20110202044141AAS1EMp 10. www. itsmyacademy. com/nuclear-forces-and-properties-of-nuclear-forces/ 11. www. ndt-ed. org/EducationResources/HighSchool/Radiography/fission\_popup. htm www. physics. weber. edu/amiri/physics3710/nuclearphys-1. pdf www. physicshandbook. om/topic/topicn/nuclearf. htm www. quantumj11. imascientist. org. uk/2011/06/what-is-the-difference-between-the-weak-nuclear-force-and-the-strong-nuclear-force www. web. utk. edu/~cnattras/Phys250Fall2012/modules/module%205/nuclear\_properties. htm www. winnerscience. com/science/nuclear-force-properties/ DiGiuseppe, Howes, Speijer, Stewart, van Bemmel, Vucic, Wraight. « Physics 11: University Preparation. » Toronto: Nelson Education Ltd, 2011. Assignment #1 Nuclear Force and its Uses Teacher: Eva Strazimiri Student: Anastasiia Nesterova