Student 5: Low Achieved

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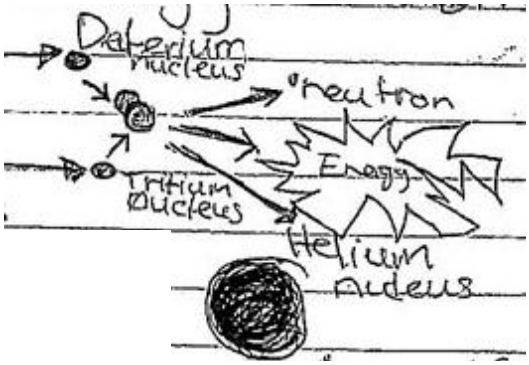
1 Nuclear fusion is where nuclei (lightweight) break free of their positively charged protons and fuse together to make a heavier nucleus. In this reaction, the fused nuclei mass is smaller than if the nuclei were individual. This relates to binding energy, the smaller the total mass of the fused nuclei the more / higher amount of energy is released to form the heavier nucleus e.g.



In my example, this is Deuterium and Tritium fusion. This produces the most energy and the by-product of this reaction produces helium. For this reaction to happen though, the two nucleus needs to break free of the positively charged protons. For this to happen, the nuclei need to be excited (moving really fast). The reason behind this is at this excited state the nuclei can break free of the coulombic repulsion and thus fuse together. For the nuclei to achieve this excited state it has to be heated, extremely heated. This heat is called thermonuclear. The thermonuclear reaction produces matter called plasma, plasma has free electrons and free nuclei, when these nuclei are moving at their excited speed they overcome their repulsion and fuse. The energy produced by the fused reaction of the two

2 nuclei mass is different from the two individual mass of the nuclei without the fused reaction. The missing mass from the fused reaction of the two nuclei is the energy produced according to the Einstein's theory of $E=\Delta mc^2$ where Δm being the Δm and c = the speed of light, increasing some of the binding energy that was in the two individual nuclei, which actually reduces the net mass of the two nuclei is gone, change into energy.

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