CLAIMS

1. A method of merging and compressing compact tori plasma within a system comprising a central chamber (20), diametrically opposed formation sections (12N, 12S), a plurality of active magnetic coils (32N, 32S) disposed about and axially along the formation sections, one or more acceleration sections (16N, 16S), a plurality compression sections (14N, 14S) configured with a conically constricting flux conserver and interposing the formation sections and adjacent acceleration sections and interposing the central chamber and adjacent acceleration sections, and a plurality of active magnetic coils (36N and 36S) disposed about and axially along the acceleration section (16N, 16S) the steps comprising:

forming and accelerating compact tori in a staged symmetric sequence within the formation sections and the acceleration sections towards a mid-plane of the central chamber,

passively adiabatically compressing the compact tori within the compression sections, and

magnetically compressing the merged compact tori within the central chamber.

2. The method of claim 1 further comprising the steps of colliding and merging the compact tori within the central chamber.

3. The method of claims 1 and 2 wherein the steps of forming and accelerating the compact tori includes powering the plurality of active magnetic coils about and axially along the formation sections and acceleration sections.

4. The method of claims 1 and 2, wherein the step of forming and accelerating the compact tori further comprises synchronously firing diametrically opposed pairs of active magnetic coils positioned about and along the formation and acceleration sections.

5. The method of claim 3, wherein the step of forming and accelerating the compact tori further comprises synchronously firing diametrically opposed pairs of active magnetic coils positioned about and along the formation and acceleration sections.

6. The method of claim 4, wherein the step of magnetically compressing a merged compact tori comprises synchronously firing active magnetic coils positioned about and along the compression chamber with the firing active magnetic coils positioned about and along the formation and acceleration sections.

7. The method of claim 5, wherein the step of magnetically compressing a merged compact tori comprises synchronously firing active magnetic coils positioned about and along the compression chamber with the firing active magnetic coils positioned about and along the formation and acceleration sections.

8. The method of claims 1, 2 and 5 through 7, further comprising the step of generating a DC guide field within and axially extending through the compression chamber, the formation sections, the acceleration sections, and the compression stages.

9. The method of claim 3, further comprising the step of generating a DC guide field within and axially extending through the compression chamber, the formation sections, the acceleration sections, and the compression sections.

10. The method of claim 4, further comprising the step of generating a DC guide field within and axially extending through the compression chamber, the formation sections, the acceleration sections, and the compression sections.

11. The method of any preceding claim wherein the compact tori are one of FRC and spheromak starter plasmas.

12. The method of any preceding claim, wherein the compression sections are formed from conducting material and the central compression chamber and the formation and acceleration sections are formed from non-conducting material.