

PRESENT STATUS OF THE TRISTAN ACCELERATOR CONSTRUCTION

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The TRISTAN Phase-I project aims at achieving electron-positron beam collisions in the CMS energy range of 30 ~ 60 GeV. The project has been carried into execution in April 1981 and is scheduled to be completed in 1986. The TRISTAN Phase-I accelerator complex consists of

1. a main electron-positron colliding ring, MR, (FY 1982 ~ FY 1985),
2. an electron-positron accumulation ring, AR, as a booster for MR (FY 1981 ~ FY 1982),
3. a linear accelerator as an electron and positron injector for AR (in operation), and
4. a high intensity electron linear accelerator for positron beam generation (FY 1982 ~ FY 1984).

The accelerators are to be built in the periods of time noted above. The construction of the AR tunnel has begun in November 1981 under the direction of the Civil Engineering Division. Preparations of accelerator components for AR are underway on schedule. General parameters of the accelerators are listed in Table 1 ~ Table 4.

Table 1

General Parameters of the Main Electron-Positron Colliding Ring

|  |   |
|--|---|
| Circumference  | 3018.08 m   |
| Length of long straight sections                                 | 194.35 m × 4  |
| Average radius of curved section                                 | 346.69 m  |
| Bending radius   | 246.53 m  |
| Revolution frequency   | 99.33 kHz   |
| RF frequency   | 508.58 MHz  |
| Whole length of RF cavities                                      | 350 m   |
| Injection energy   | 6 ~ 8 GeV   |
| Maximum energy   | 25 ~ 30 GeV   |
| Number of interaction regions                                    | 4   |
| Amplitude functions at colliding point ( $\beta_x^*/\beta_y^*$ ) | 1.12 m / 0.07 m                                     |
| Maximum design luminosity  | $5 \times 10^{31} \text{ cm}^{-2} \text{ sec}^{-1}$ |

Table 2

## General Parameters of the Accumulation Ring

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|                                  |             |
|----------------------------------|-------------|
| Circumference                    | 377 m       |
| Length of long straight sections | 19.45 m × 2 |
| Length of RF sections            | 19.05 m × 2 |
| Average radius of curved section | 47.7 m      |
| Bending radius                   | 23.17 m     |
| Revolution frequency             | 0.795 MHz   |
| RF frequency                     | 508.58 MHz  |
| Injection energy                 | 2.5 ~ 3 GeV |
| Maximum energy                   | 6 ~ 8 GeV   |
| Maximum design beam current      | 60 mA       |

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Table 3

## General Parameters of the Main Injector Linac

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|                                  |                |
|----------------------------------|----------------|
| Maximum beam energy              | 2.5 ~ 3 GeV    |
| Acceleration frequency           | 2856 MHz       |
| Beam pulse width                 | ~ 1 ns         |
| Peak current (electron/positron) | 500 mA / 10 mA |
| Repetition rate                  | 50 pps         |

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Table 4

## General Parameters of the Positron Beam Source

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|   |         |
|---|---------|
| <u>Electron linac for positron generation</u> |         |
| Electron beam energy                          | 200 MeV |
| Beam pulse width                              | ~ 1 ns  |
| Peak current                                  | 10 A    |
| Energy spread                                 | 1 %     |
| <u>Post-linac for positron acceleration</u>   |         |
| Positron beam energy                          | 200 MeV |
| Beam pulse width                              | ~ 1 ns  |
| Peak positron current                         | 10 mA   |
| Energy spread                                 | 5 %     |

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