

## UC Davis/ MNRC Irradiation Facility

By: H. Ben Liu, Ph.D.  
Nuclear Specialist  
E-mail: [hbliu@mnrc.ucdavis.edu](mailto:hbliu@mnrc.ucdavis.edu)

Date: 07/25/2002

### UNPERTURBED neutron fluxes and heating at 2 MW operating power (TRIGA reactor).

Facility	Thermal < .1 eV (n/cm <sup>2</sup> .s)	Fast > 1 MeV (n/cm <sup>2</sup> .s)	Heating in Aluminum (W/g)	Heating in Tissue (W/g)	Diameter (cm)	Length (cm)
<b>CIF<sup>†</sup></b> <b>(Water)</b>	<b>4.5 * 10<sup>13</sup></b>	8.4 * 10 <sup>12</sup>	0.27	0.65	4.7	38
<b>CIF</b> <b>(Void)</b>	<b>3.2 * 10<sup>13</sup></b>	---	---	---	---	---
<b>PTS<sup>‡</sup></b> <b>(Void)</b>	<b>1.4 * 10<sup>13</sup></b>	5.7 * 10 <sup>12</sup>	0.12	0.40	1.5	11
<b>NTD</b> <b>(Water)</b>	<b>6.3 * 10<sup>11</sup></b>	2.0 * 10 <sup>10</sup>	0.0046	0.0052	10	25
<b>NTD</b> <b>(Void)</b>	<b>7.3 * 10<sup>11</sup></b>	---	---	---	---	---

**CIF:** Central Irradiation Facility.

**PTS:** Pneumatic Transfer System.

**NTD:** Neutron Transmutation Doping. (> 10 locations)

**NIF:** Neutron Irradiation Facility: usable space 9" in diameter and 10" in length

$\phi_{1 \text{ MeV eq.}} \cong 4.2 * 10^{10} \text{ n/cm}^2 \cdot \text{sec}$

$\phi_{\text{thermal}} \cong 0.1\% \text{ of } \phi_{1 \text{ MeV eq.}}$

$D_{\text{fast neutrons (Si)}} \cong 50 \text{ Gy/hr}$

$D_{\text{gamma rays (Si)}} \cong 160 \text{ Gy/hr}$

† **Maximum value.** Active length of TRIGA fuel is 15". Dependent on the control rod elevation, average thermal flux could decrease to **50% of 4.5 \* 10<sup>13</sup> n/cm<sup>2</sup>.sec** at 7.5" away from reactor core center.

‡ **Maximum value.** Average thermal flux is **1.2 \* 10<sup>13</sup> n/cm<sup>2</sup>.sec**; 1.4 \* 10<sup>13</sup> n/cm<sup>2</sup>.sec at the bottom and 1.0 \* 10<sup>13</sup> n/cm<sup>2</sup>.sec on the top.