Section 8

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**LASER BEAM HAZARDS**

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8.1 There are two categories of laser injuries:

* Thermal injuries- the laser energy absorbed by the tissue raises the tissue temperature enough to result in a burn. The skin or the eyes can be injured by laser burns and the extent of the injuries is dependant upon the wavelength and classification of the laser.
* Photochemical injuries- photon energy breaks molecular bonds causing injury to the skin or the eyes.

8.2 Eye Injuries

Acute exposure may result in corneal or retinal burns. Chronic exposures can result in cataract formation or retinal damage. Although damage to the retina can be pain free, retinal damage can result in partial or total blindness when the optic nerve is damaged. Retinal damage can be irreversible.

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| **Eye Injuries at Various Wavelengths**  **wavelength (um) type of primary Injury**  0.18 - 0.4 UV- Thermal or photochemical injury to the cornea  0.4 - 0.6 Visible - Thermal or photochemical injury to retina  0.4 - 1.4 Retinal Hazard Region- explosive retinal effects from short pulses  0.6 - 0.7 Visible - Thermal injury to the retina  0.7 - 1.4 Near IR - Thermal injury to the retina  1.4 - 2.6 Far IR – Thermal injury to the cornea or lens  2.6 - 1000 Thermal injury to the cornea |

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8.3 Skin Injuries

Acute thermal skin injuries can be first degree (reddening), second degree (blistering), or third degree burns (destruction of the skin and damage to the underlying tissue). Acute injury to the skin is usually repairable. Chronic exposure to low level UV light may result in skin cancers.