Abstract Submitted
for the TSF07 Meeting of
The American Physical Society

Positron Emission Tomography: A Basic Analysis[1] M.E. KERBACHER, Southwestern University, J.W. DEATON, University of Louisiana at Lafayette, L.C. PHINNEY, L.J. MITCHELL, J.L. DUGGAN, UNT, IBMAL TEAM — Positron Emission Tomography is useful in detecting biological abnormalities. The technique involves attaching radiotracers to a material used inside the body, in many cases glucose. Glucose is absorbed most readily in areas of unusual cell growth or uptake of nutrients so through natural processes the treated glucose highlights regions of tumors and other degenerative disorders such as Alzheimer's disease. The higher the concentration of isotopes, the more dynamic the area. Isotopes commonly used as tracers are 11C, 18F, 13N, and 15O due to their easy production and short half-lives. Once the tracers have saturated an area of tissue they are detected using coincidence detectors collinear with individual isotopes. As the isotope decays it emits a positron which, upon annihilating an electron, produces two oppositely directioned gamma rays. The PET machine consists of several pairs of detectors, each 180 degrees from their partner detector. When the oppositely positioned detectors are collinear with the area of the isotope, a computer registers the location of the isotope and can compile an image of the activity of the highlighted area based on the position and strength of the isotopes.

[1]National Science Foundation

Mariel Kerbacher
Southwestern University

Date submitted: 07 Oct 2007 Electronic form version 1.4