PANdemic 2019

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Day Two – Radiation Detectors, Gamma Spectroscopy

Gamma Spectroscopy

Samples of radioactive isotopes were identified by measuring peak energies of emitted gamma rays.


Questioning everything!

First Lab Day!

Copper and Cesium isotopes were first used as known energy standards to calibrate channels on the multi-channel analyzer to energy values. After measuring gamma ray energies at peak count, results were compared to peak values on the LBNL database to identify the two mystery isotopes. The first hypothesized isotope was Mn-54 and the second was Ba-131.

Results were confirmed by lab assistants.

Identifying Isotopes - finding Barium-131

Identifying Isotopes - finding Manganese-54

Day Three – Nuclear Astrophysics, Half Life
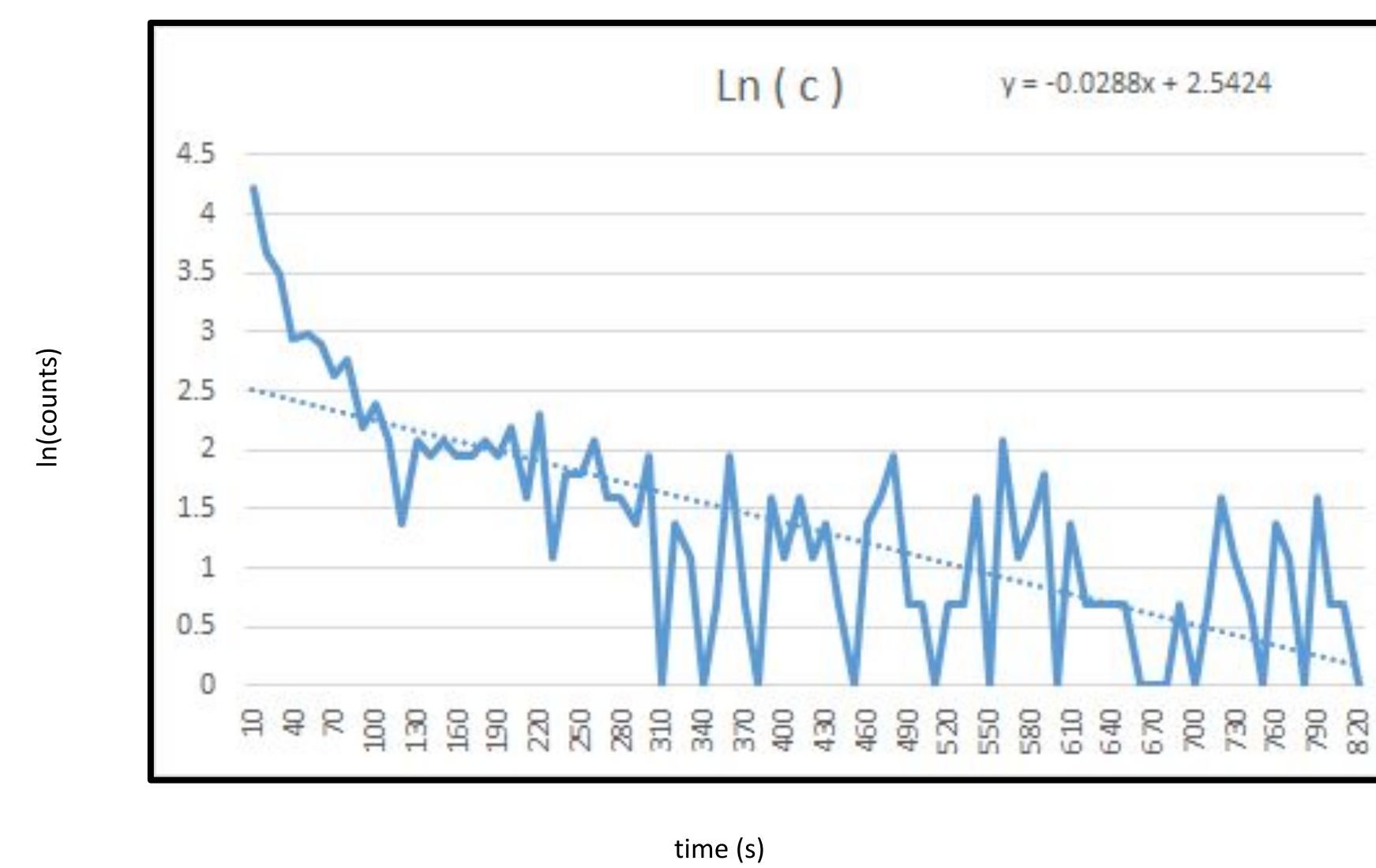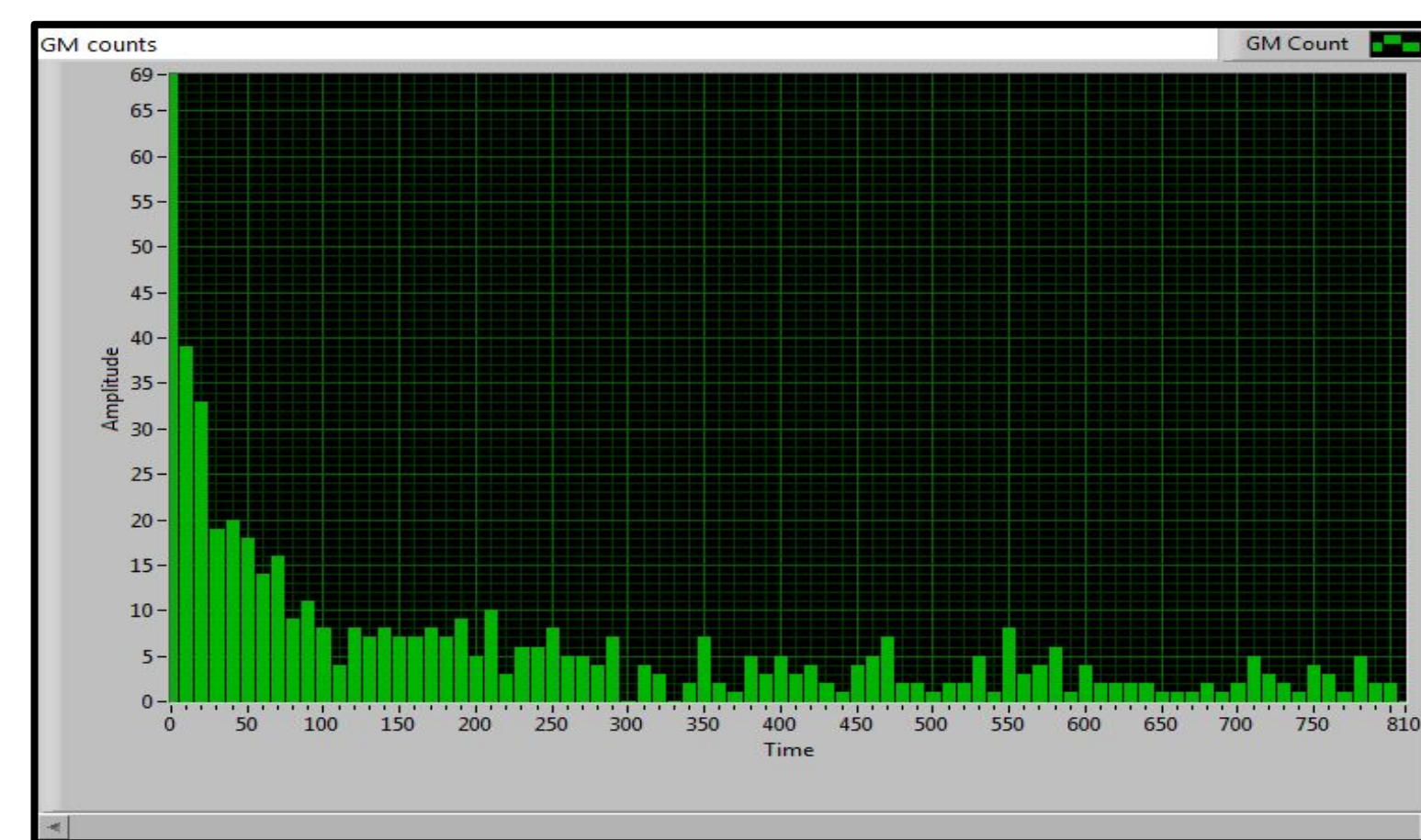
Half Life

Measuring the radiation from silver isotopes Ag-108 and Ag-110 on silver coins as they decay to identify half lives. The instrument was calibrated by changing the applied electric voltage and monitoring ion movement as the result of background radiation. Results were used to determine the optimal voltage level for the instrument.


Graphing the slope of the natural log of gamma ray counts to find the half lives of the two isotopes. The two data sets were separated (second graph unshown) at the point of full decay of the first isotope, leaving the second.

Visit to the MSU Museum
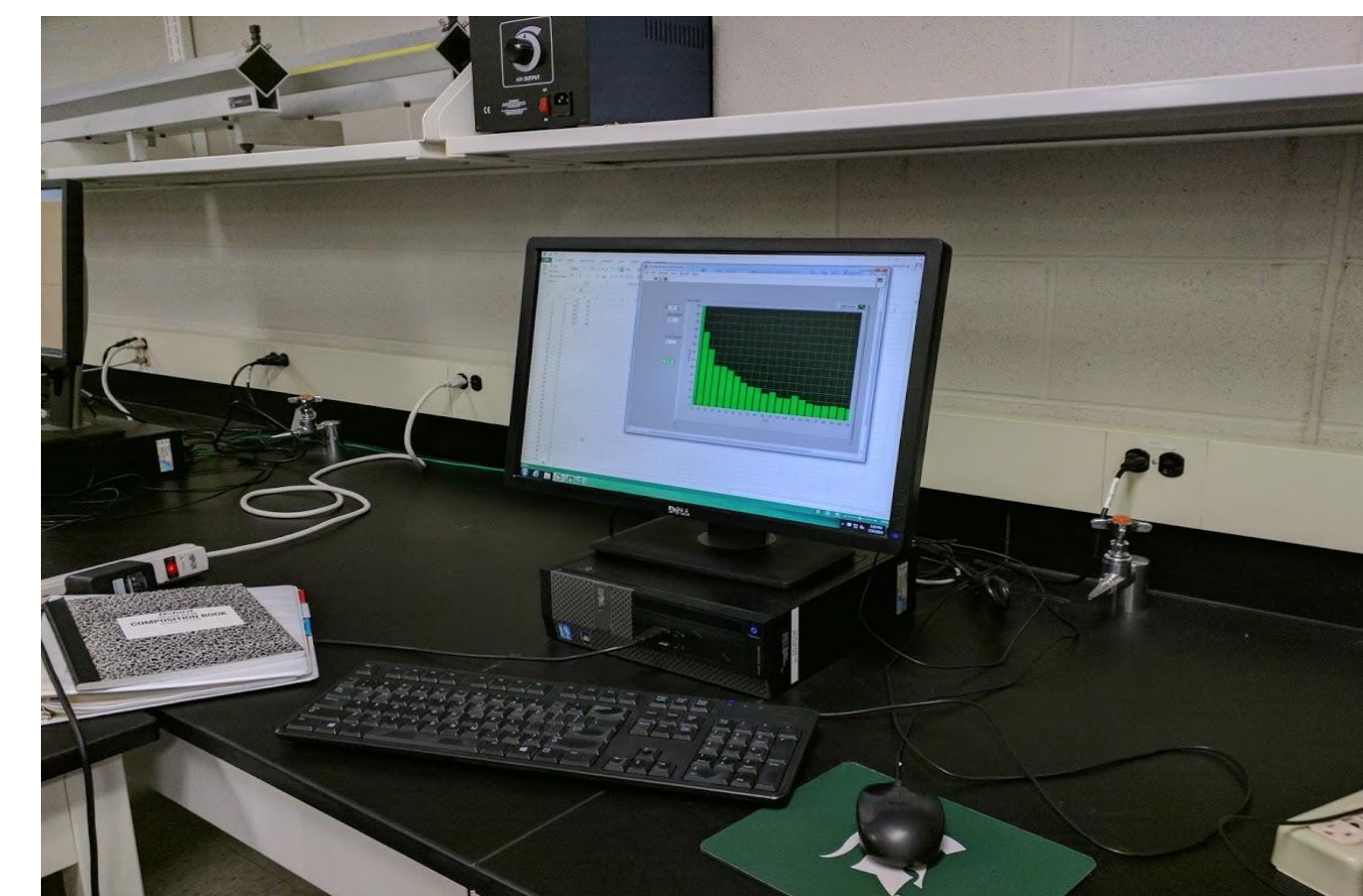
Day Four – Astronomy, Nuclear Properties with EDF
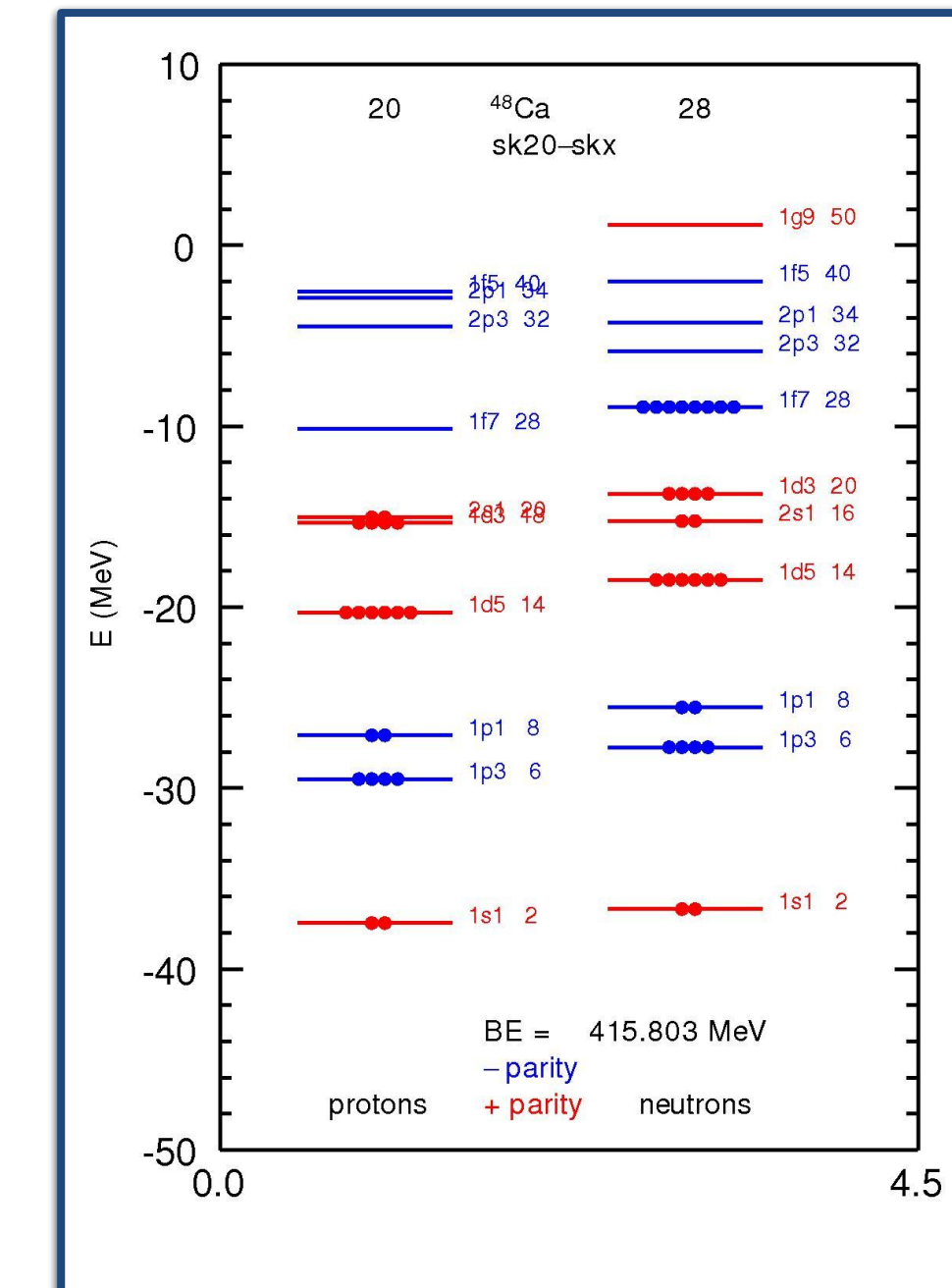
Using energy level diagrams with nuclear orbital shells to determine angular momentum, isotope magic numbers,, and proton and nuclear drip lines.
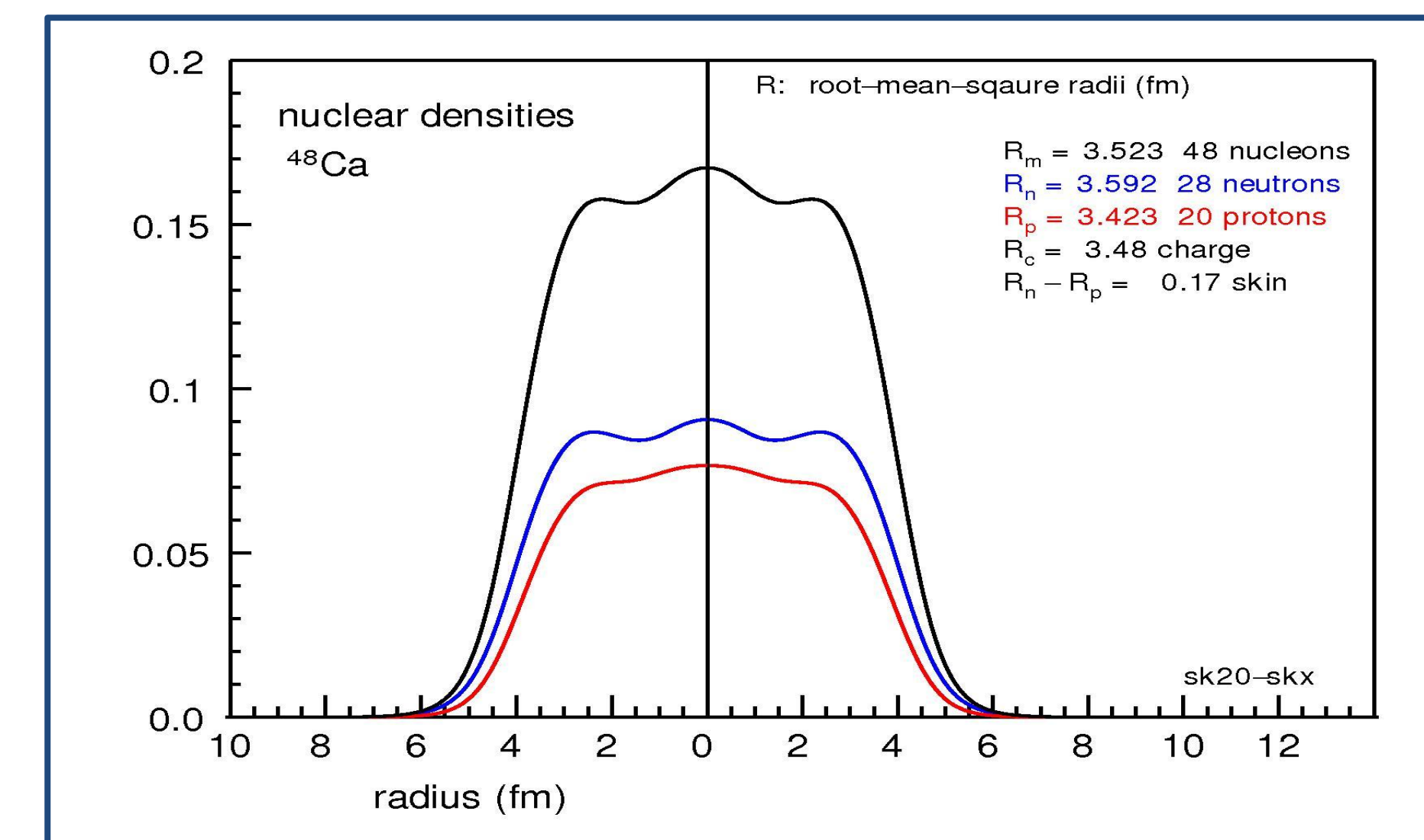
Using proton and neutron probability distribution to determine organization of the nucleus.

Coloring r and s process charts!