

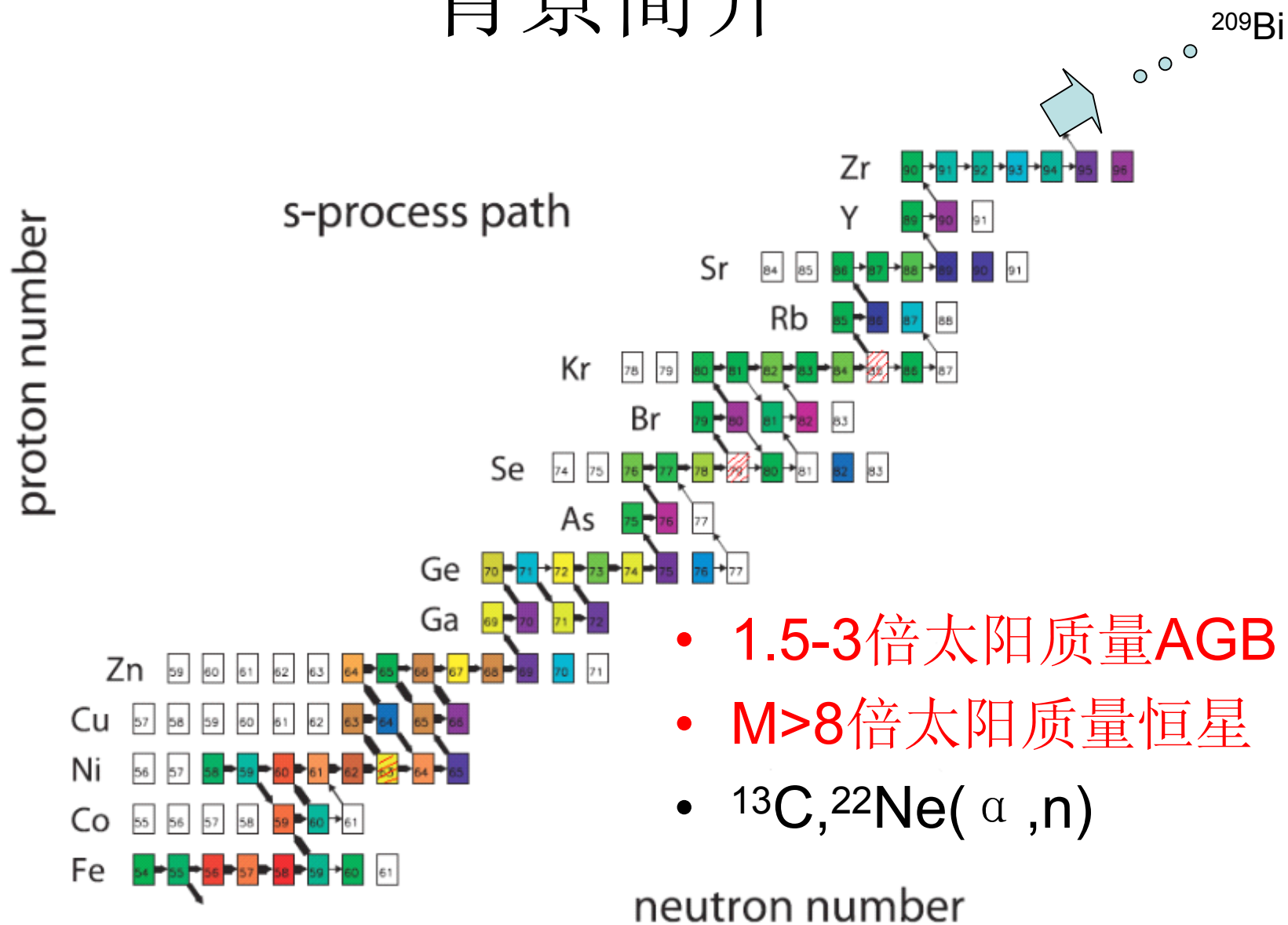
Maxwell 分布中子源

颜胜权
原子能院

主要内容

- **Maxwell**分布中子源相关背景简介
- 目前的研究状况
- 我们的努力

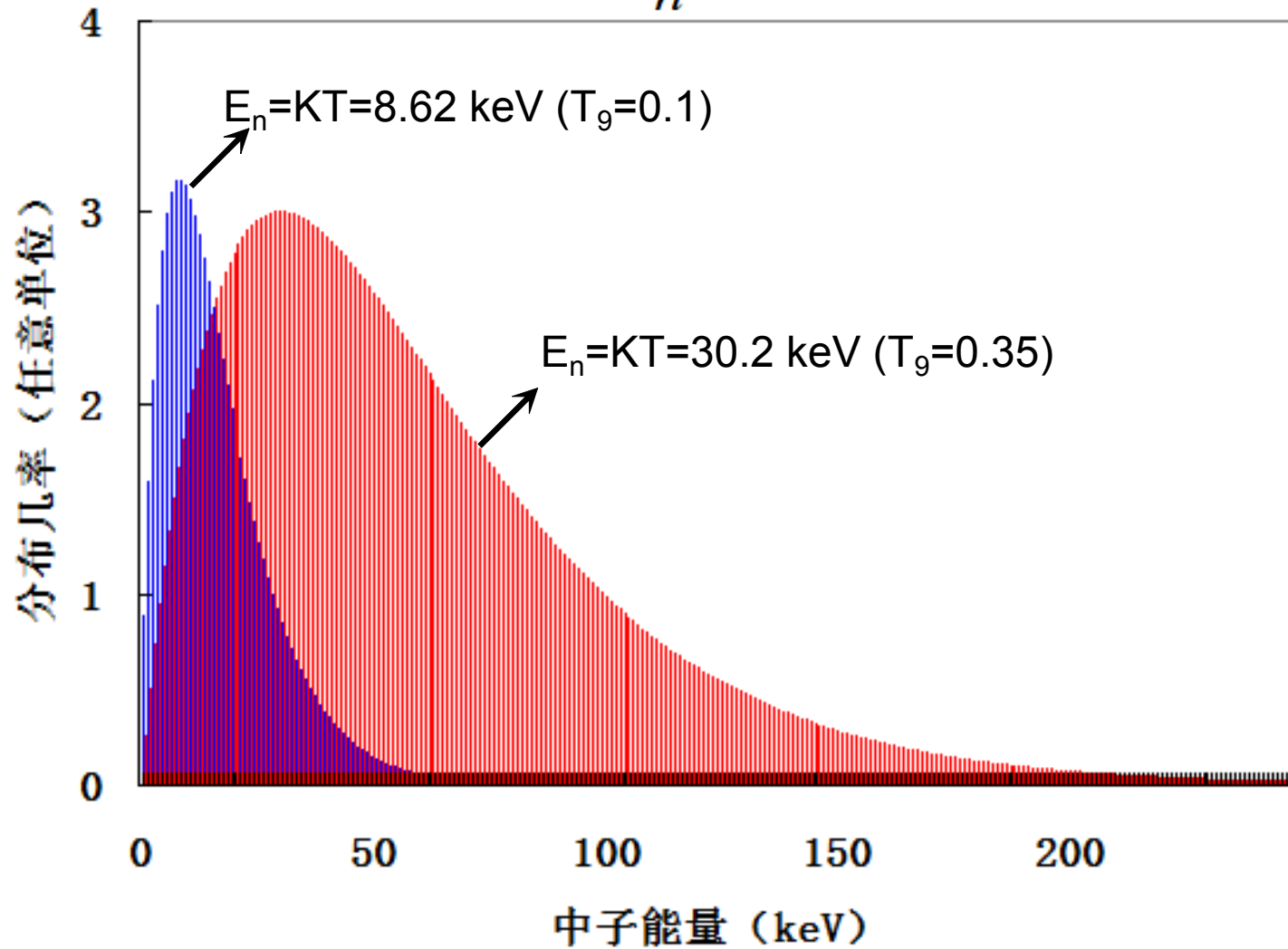
背景简介

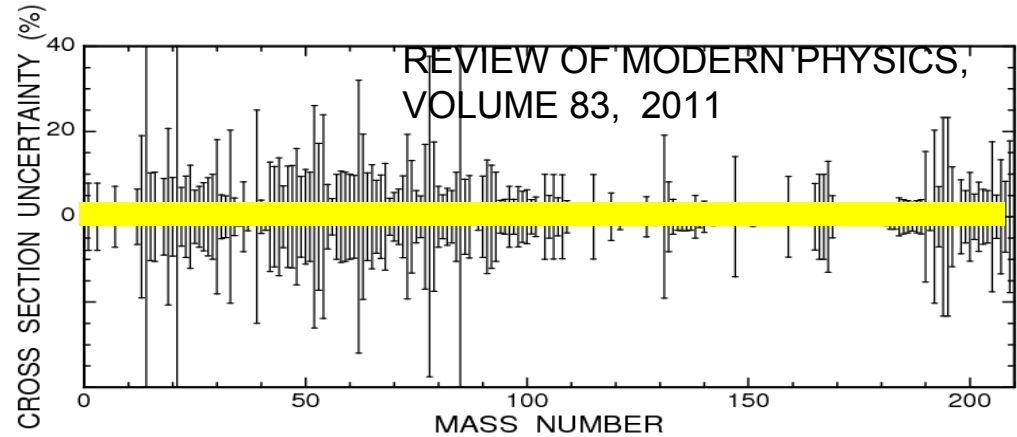
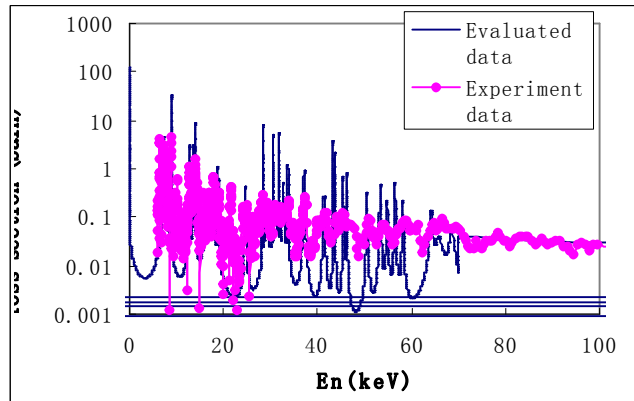
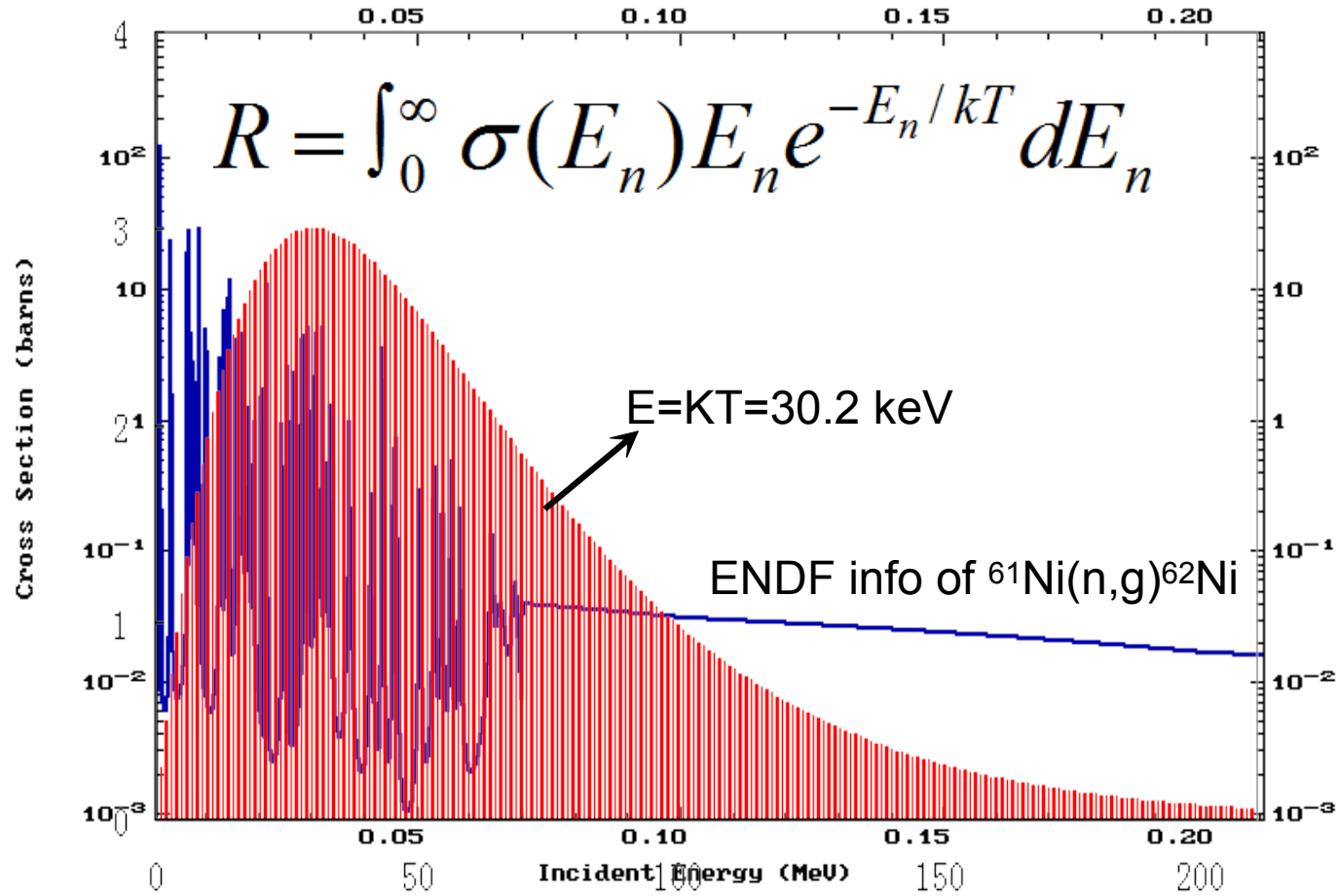


- 1.5-3倍太阳质量AGB
- $M > 8$ 倍太阳质量恒星
- $^{13}\text{C}, ^{22}\text{Ne}(\alpha, n)$

恒星内中子能谱

$$\Phi = E_n e^{-E_n/kT}$$





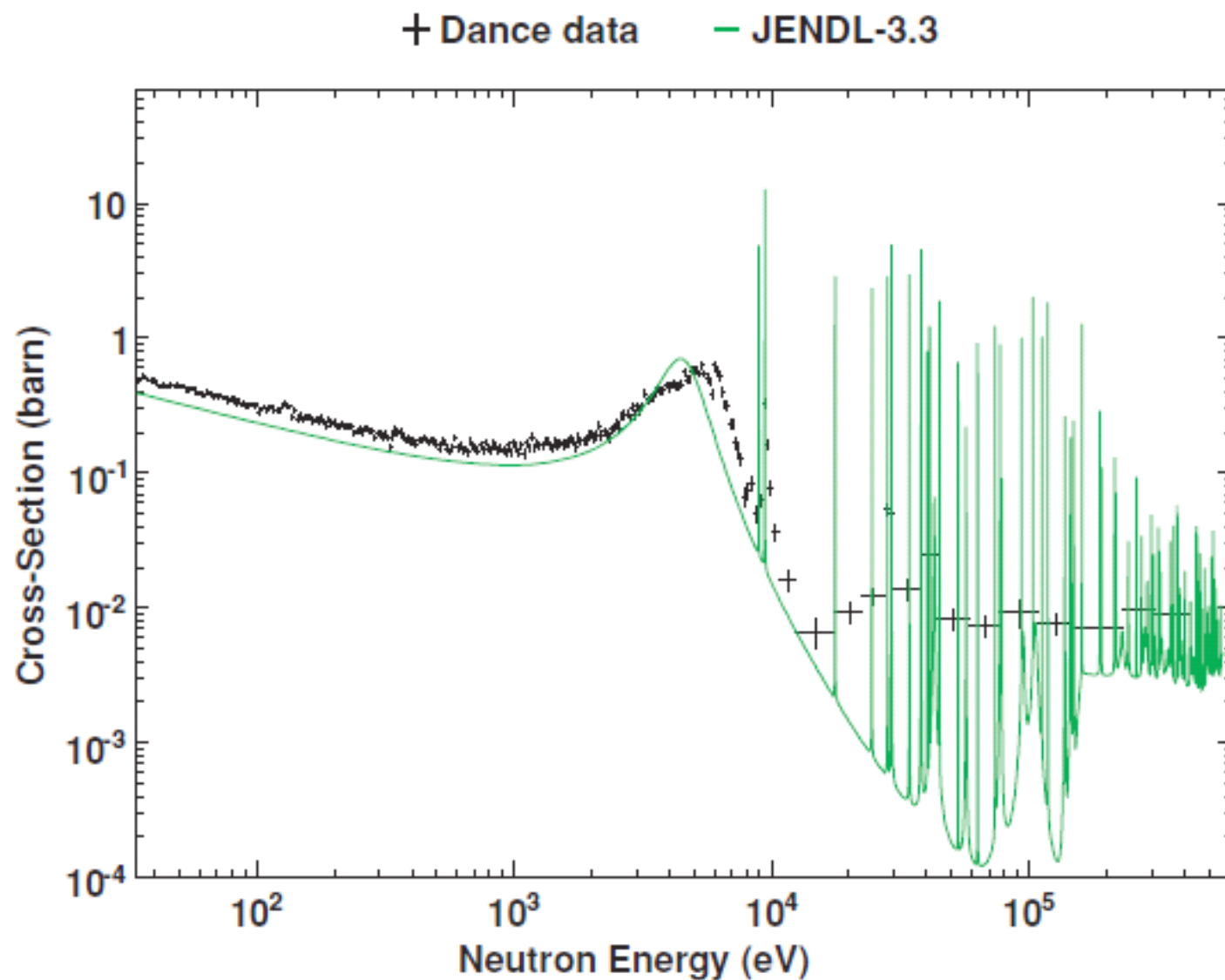
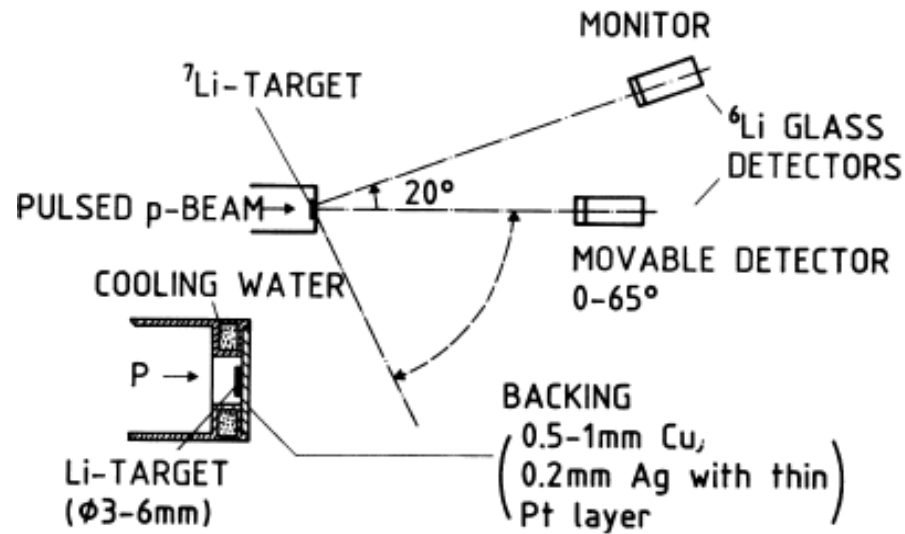


FIG. 4. (Color online) The $^{62}\text{Ni}(n,\gamma)^{63}\text{Ni}$ cross section from this experiment in comparison to the JENDL-3.3 recommendation.

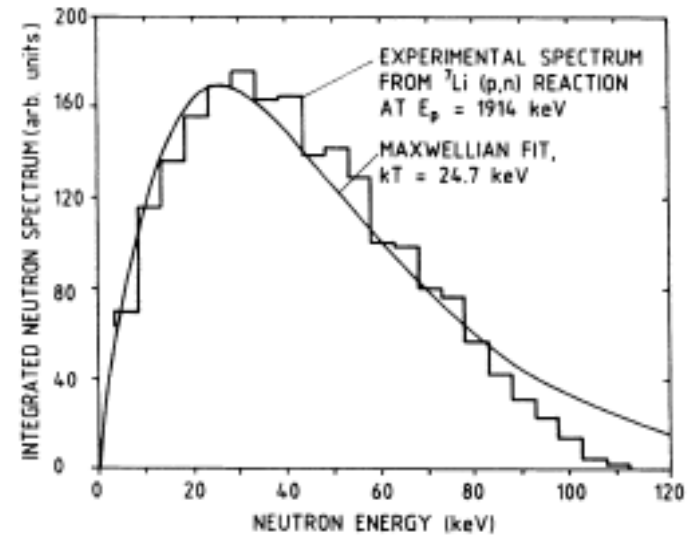
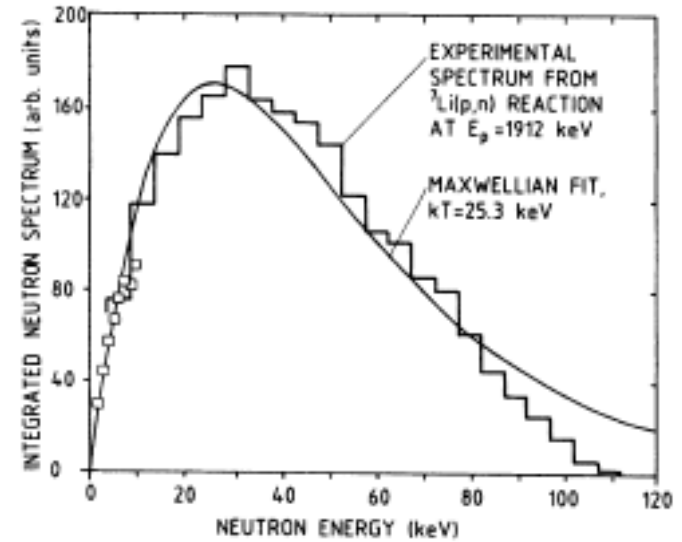
目前的研究状况

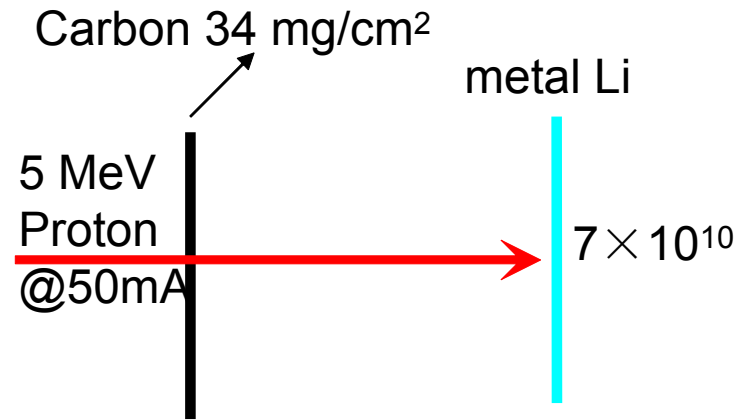
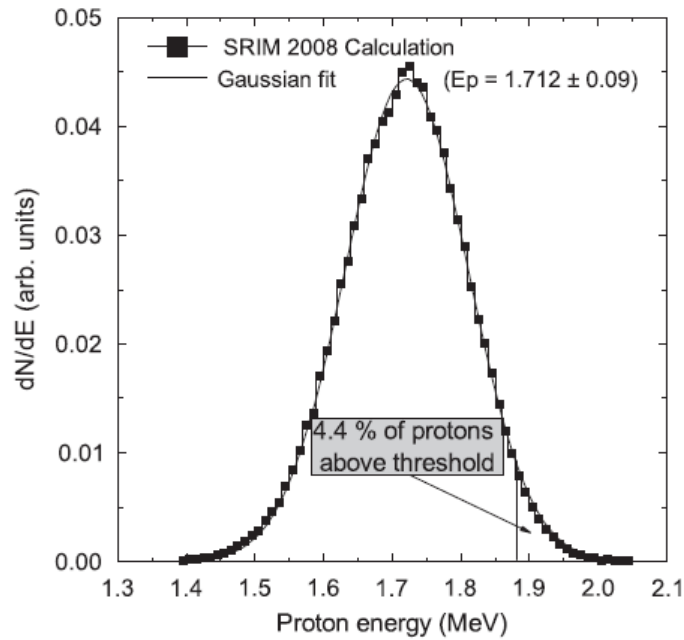
- Maxwell分布中子源直接测量。



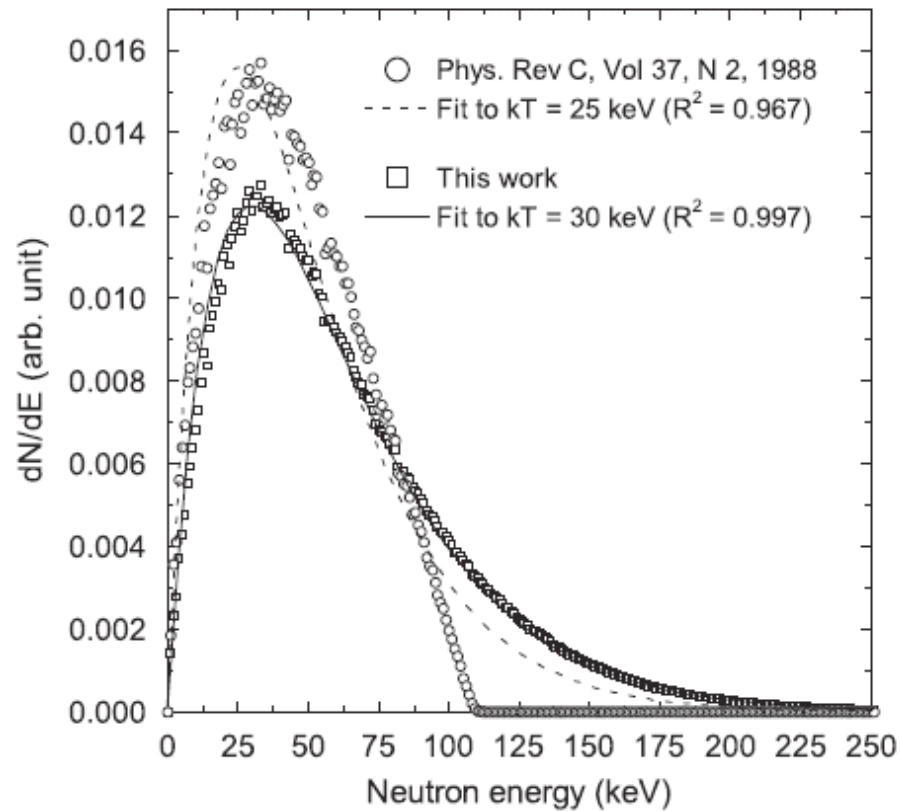
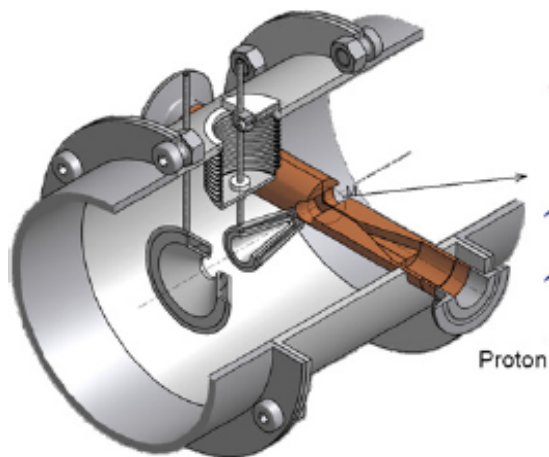
PRC, vol21, No2, 1980

PRC, Vol37, No2, 1988

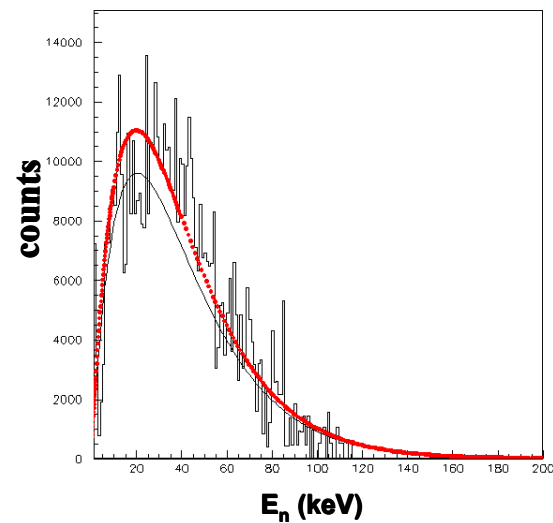
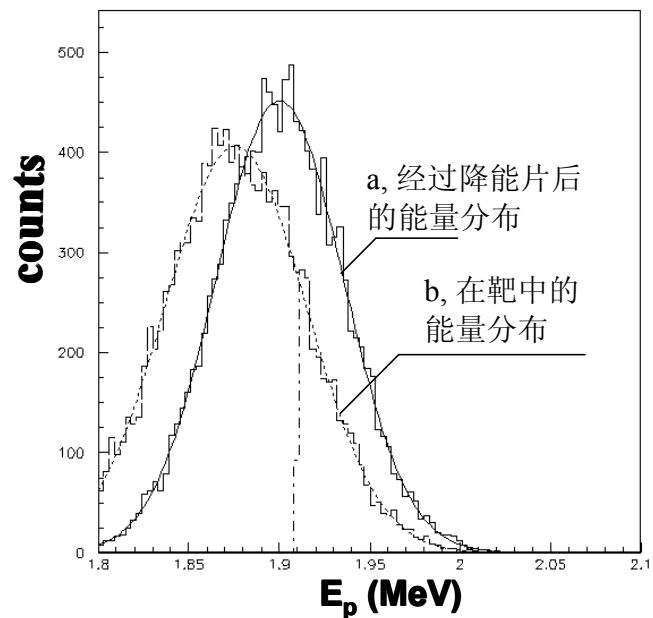
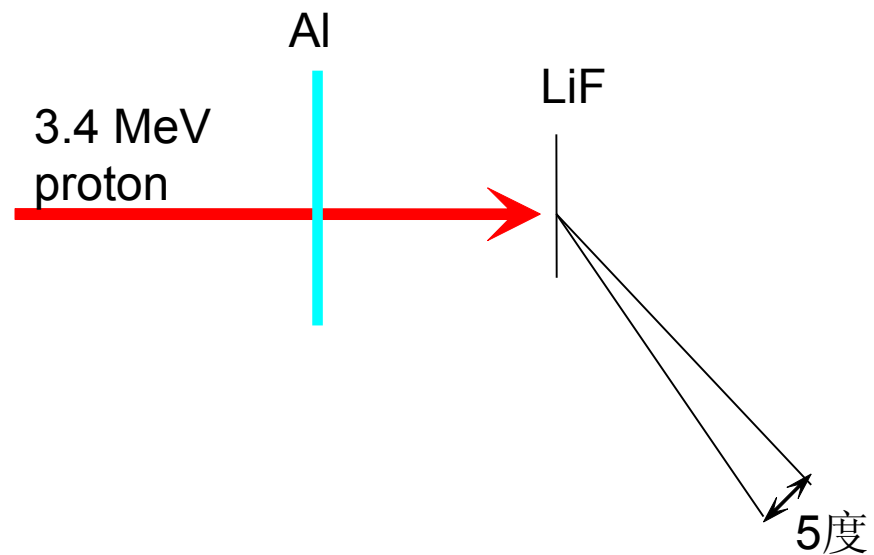
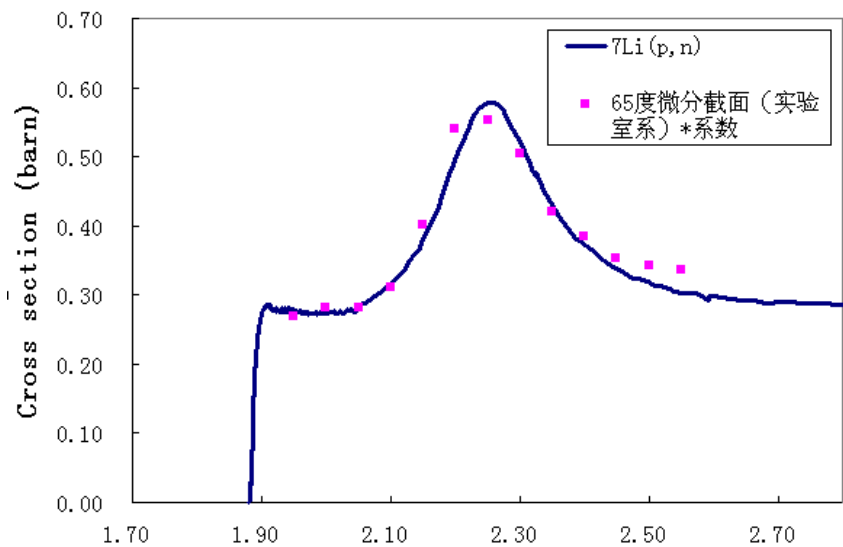




NIM A, 601(2009)333



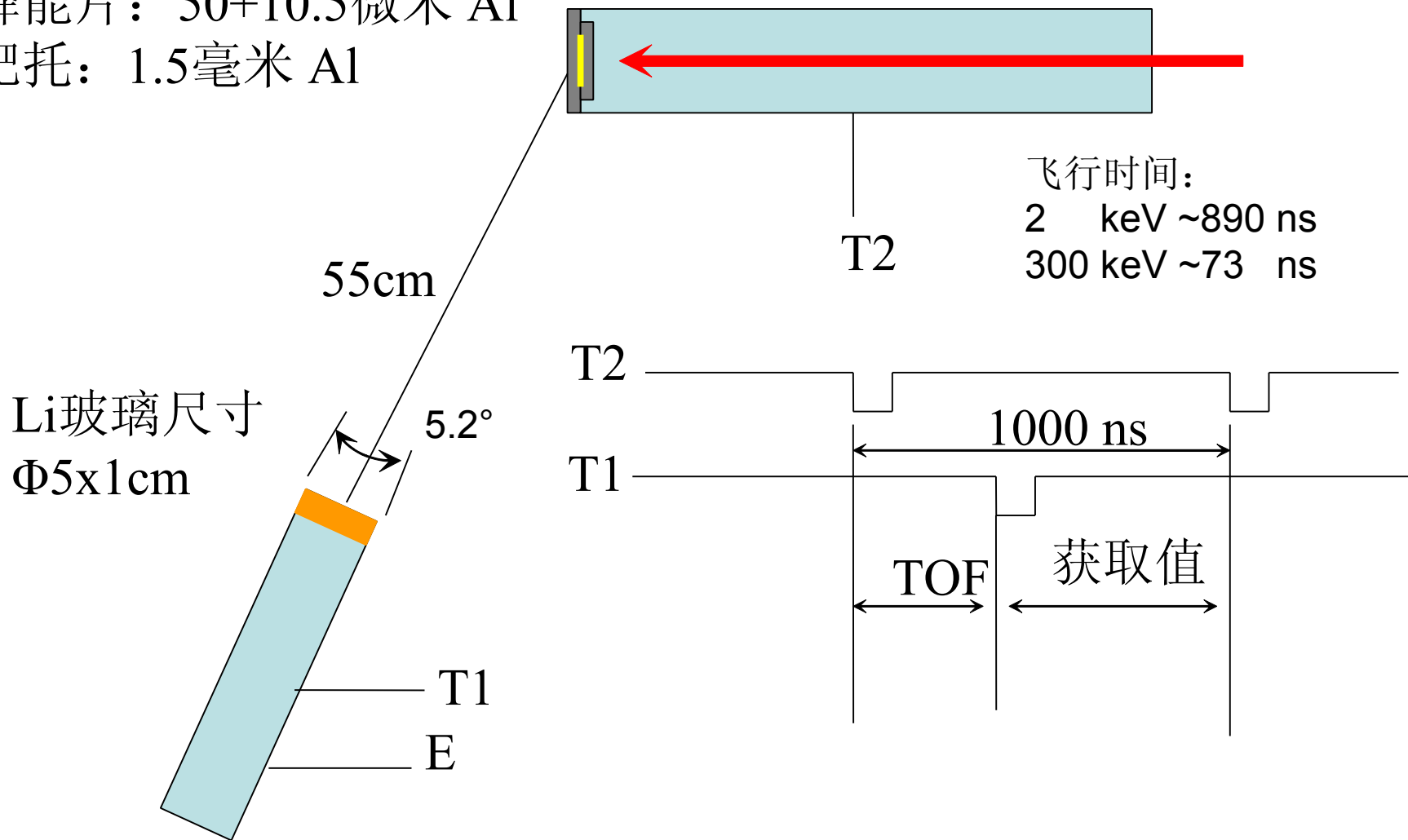
我们的努力



初步实验

靶: ${}^7\text{LiF}$ 2mg/cm²
降能片: 50+10.5微米 Al
靶托: 1.5毫米 Al

束流: 质子
3.4 MeV



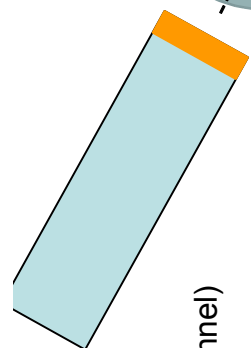
^7LiF 靶

束流

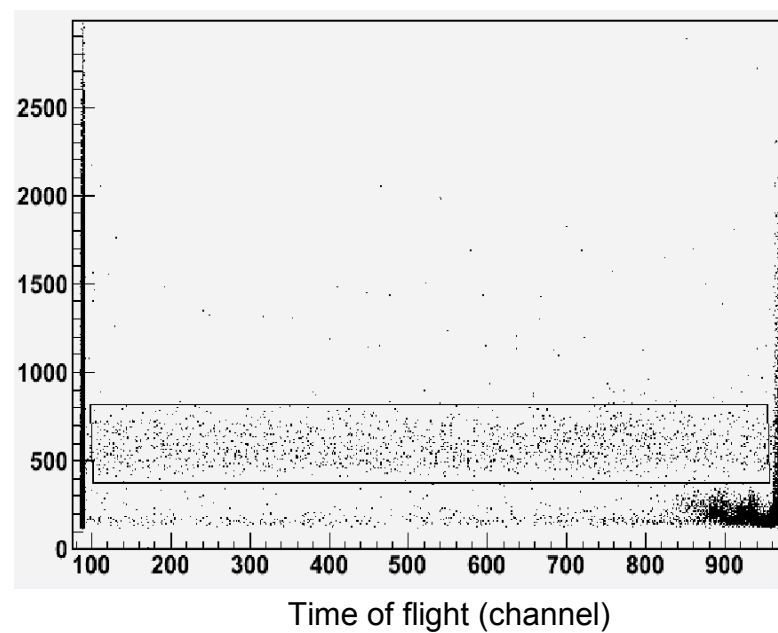
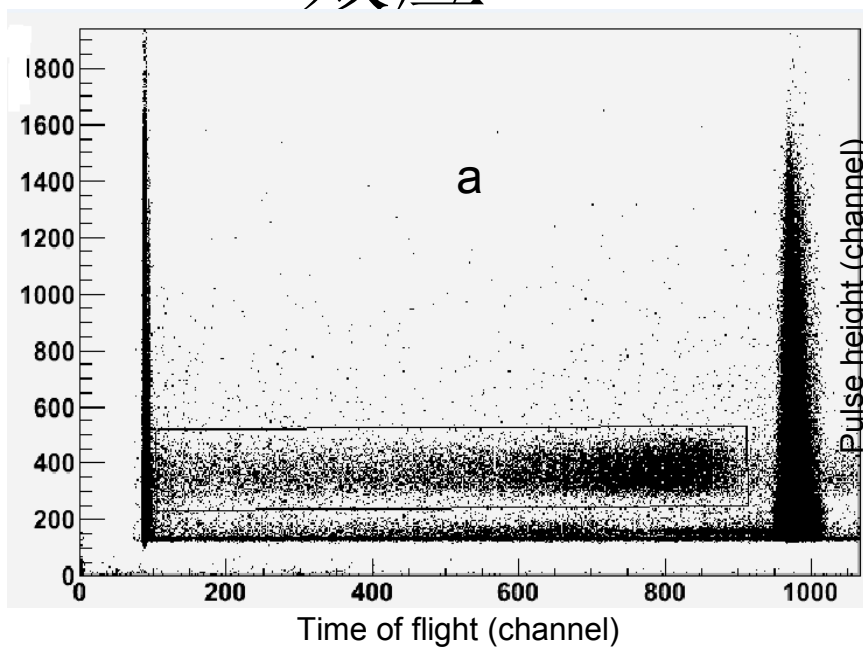


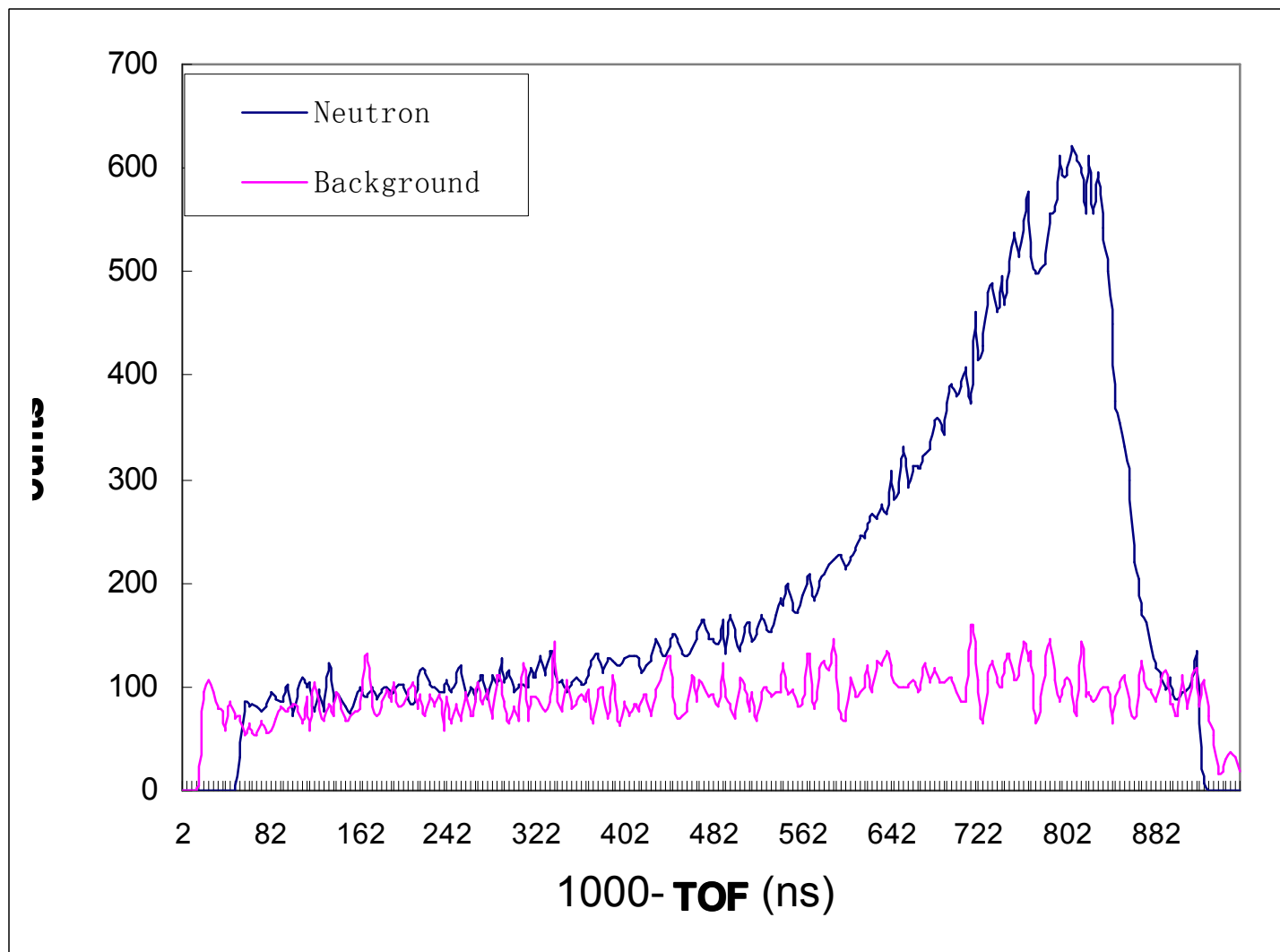
效应

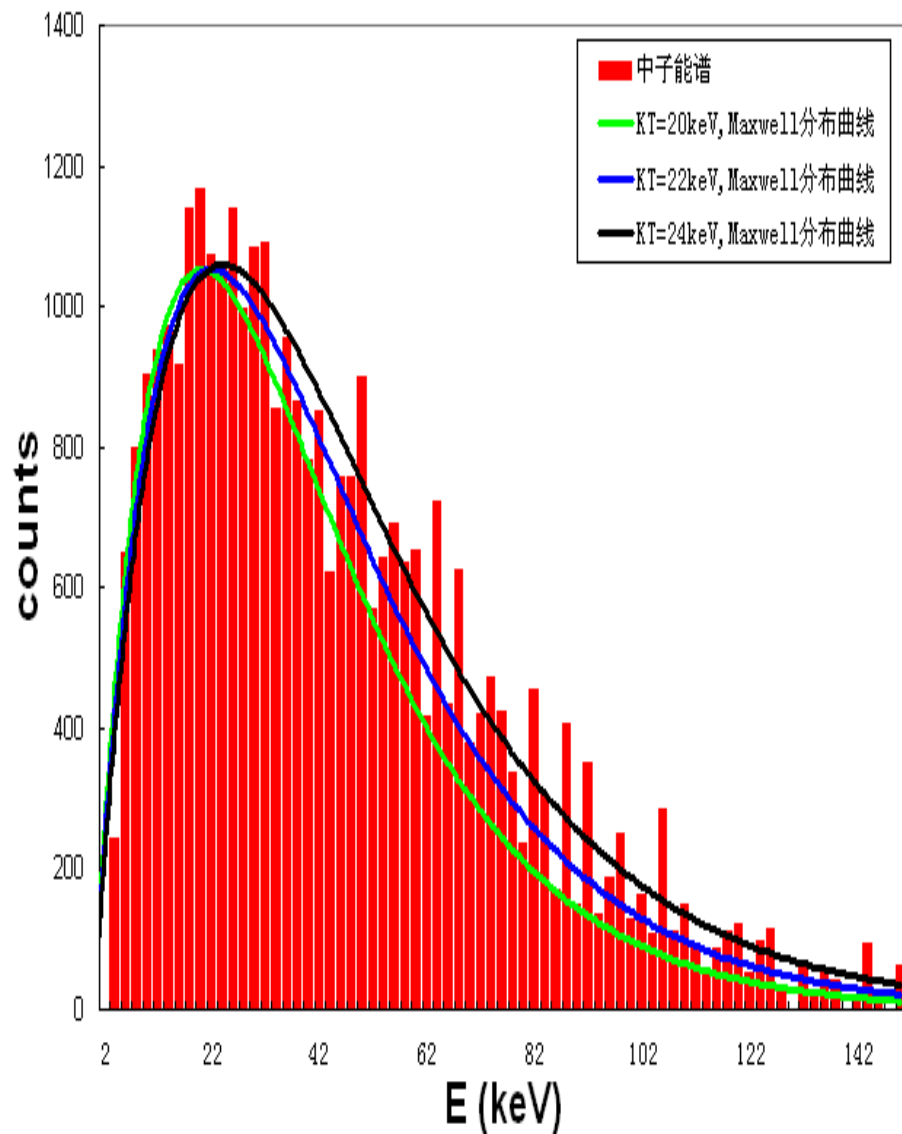
本底



^6Li 玻璃







条件: 质子束流脉宽约2 ns, 频率1M赫兹;
降能片厚度60.5微米, 探测器距靶56 cm,
探测器中心角度65度。

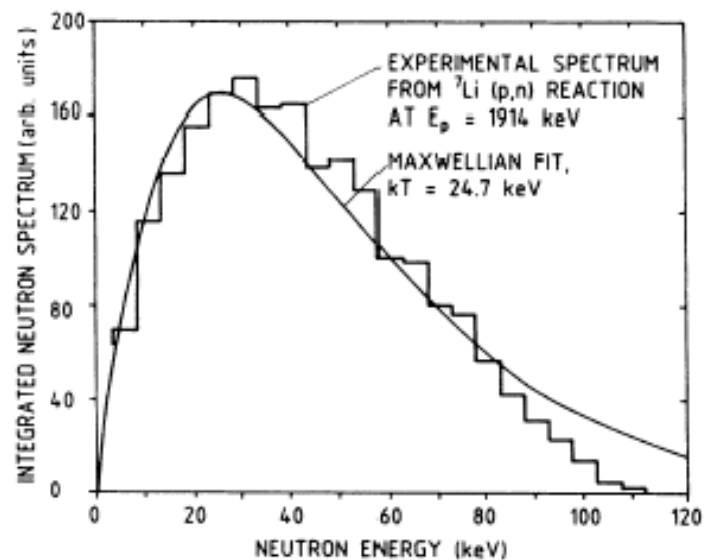
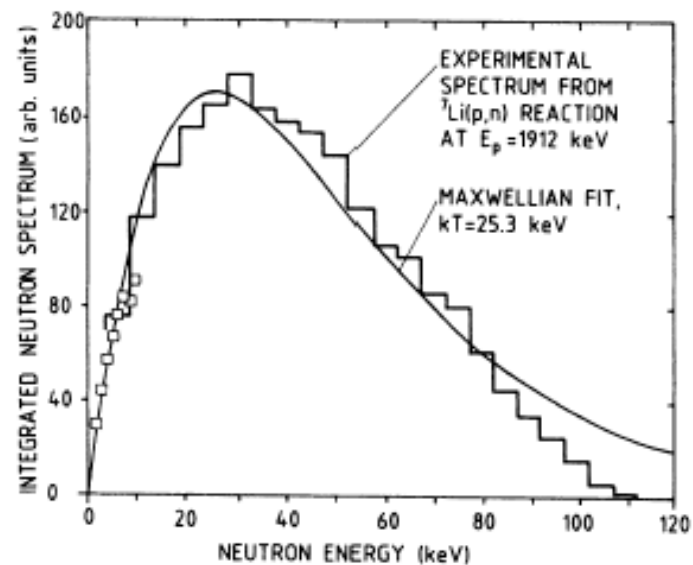


FIG. 3. Total neutron spectrum after integration over all emission angles, for proton energies $E_p = 1912$ keV (top) and 1914 keV (bottom). The squares are the result of the measurement at short flight path.

和以前工作相比：

模拟的温度：

以前的工作模拟的温度， $kT=25 \text{ keV}, 52 \text{ keV}, 28 \text{ keV}$

本工作： $kT=8-90 \text{ keV}$

束流张角：

以前的工作： 120度

本工作： 5度

万里长征刚起步！

