



BECQUEREL
PROJECT

Проект
БЕККЕРЕЛЬ

Beryllium (Boron)

Clustering

Quest in

Relativistic Multifragmentation

<http://becquerel.jinr.ru>

Облучение ядерной эмульсии радиоактивными ядрами, нейтронами и мюонами

П.И. Зарубин

Сотрудничество БЕККЕРЕЛЬ

Лаборатория физики высоких энергий имени

В. И. Векслера и А. М. Балдина

Объединенный институт ядерных исследований

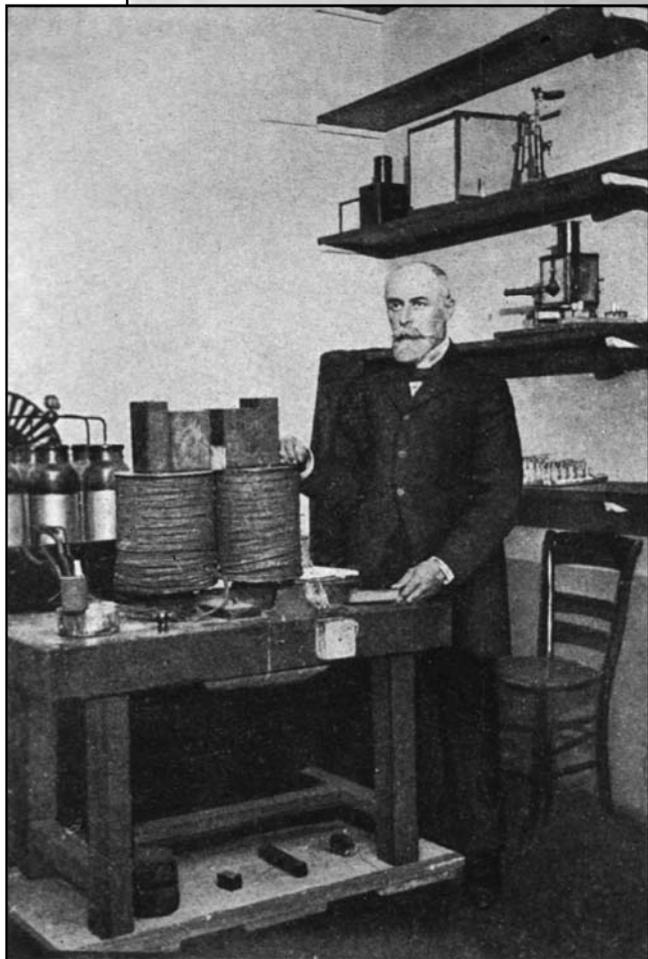
*Если не знаешь куда идти, оглянись
назад, посмотри откуда пришел.*

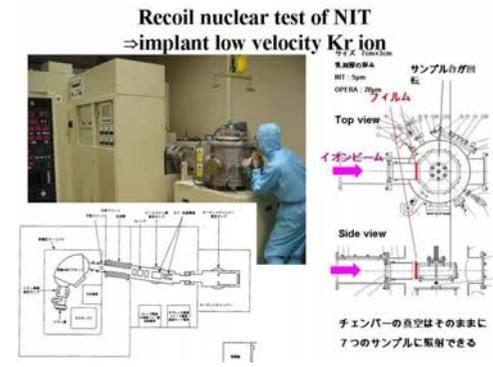
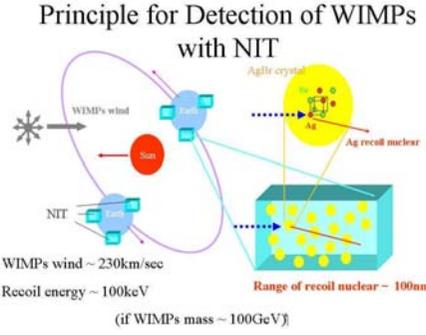
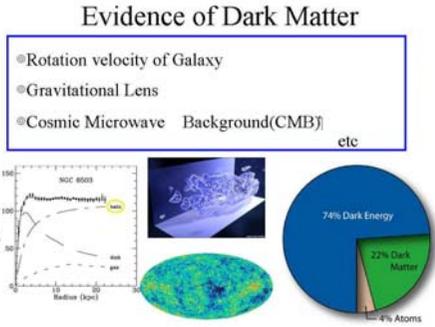
(индийская поговорка)

*If you do not know where to go, look back,
look at where you came from.*

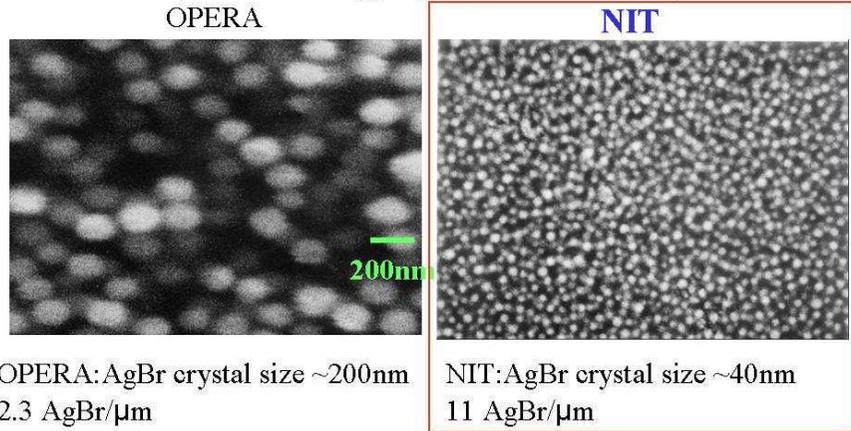
(Indian saying)

16 - 1890. Sulfate d'Ammoniac et de Potasse
Papier noir. Cuvée de Cuvée blanche.
Expérience au total le 27. et à la Cour de France le 16.
Proust le 15 mars.

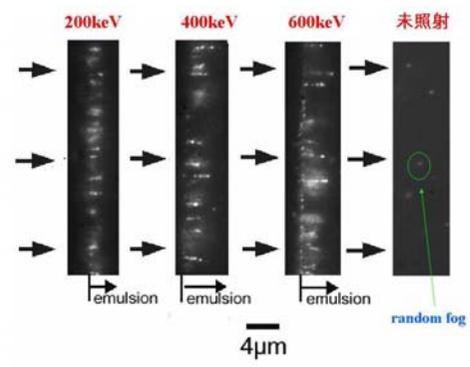




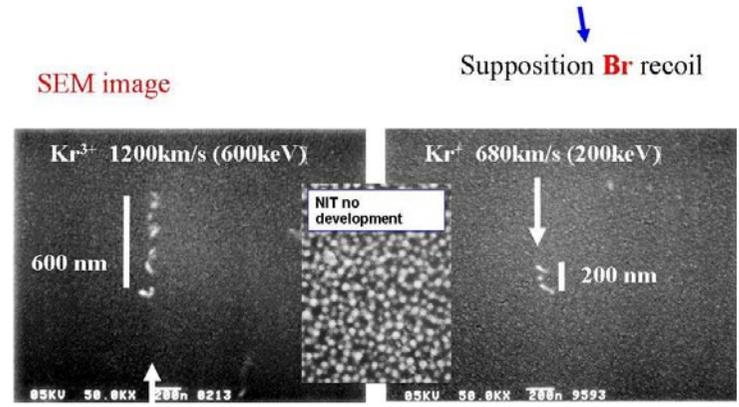
High resolution emulsion (Nano Imaging Tracker: NIT)



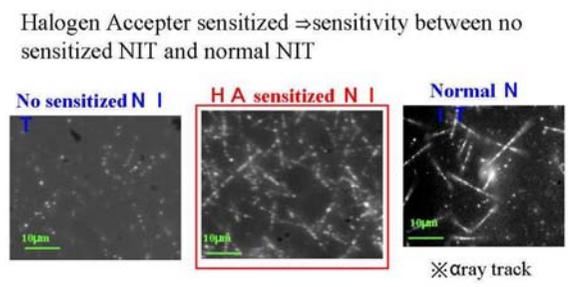
5 times resolution for OPERA!



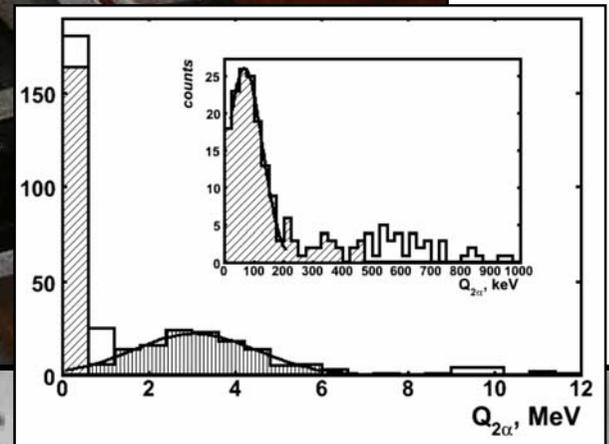
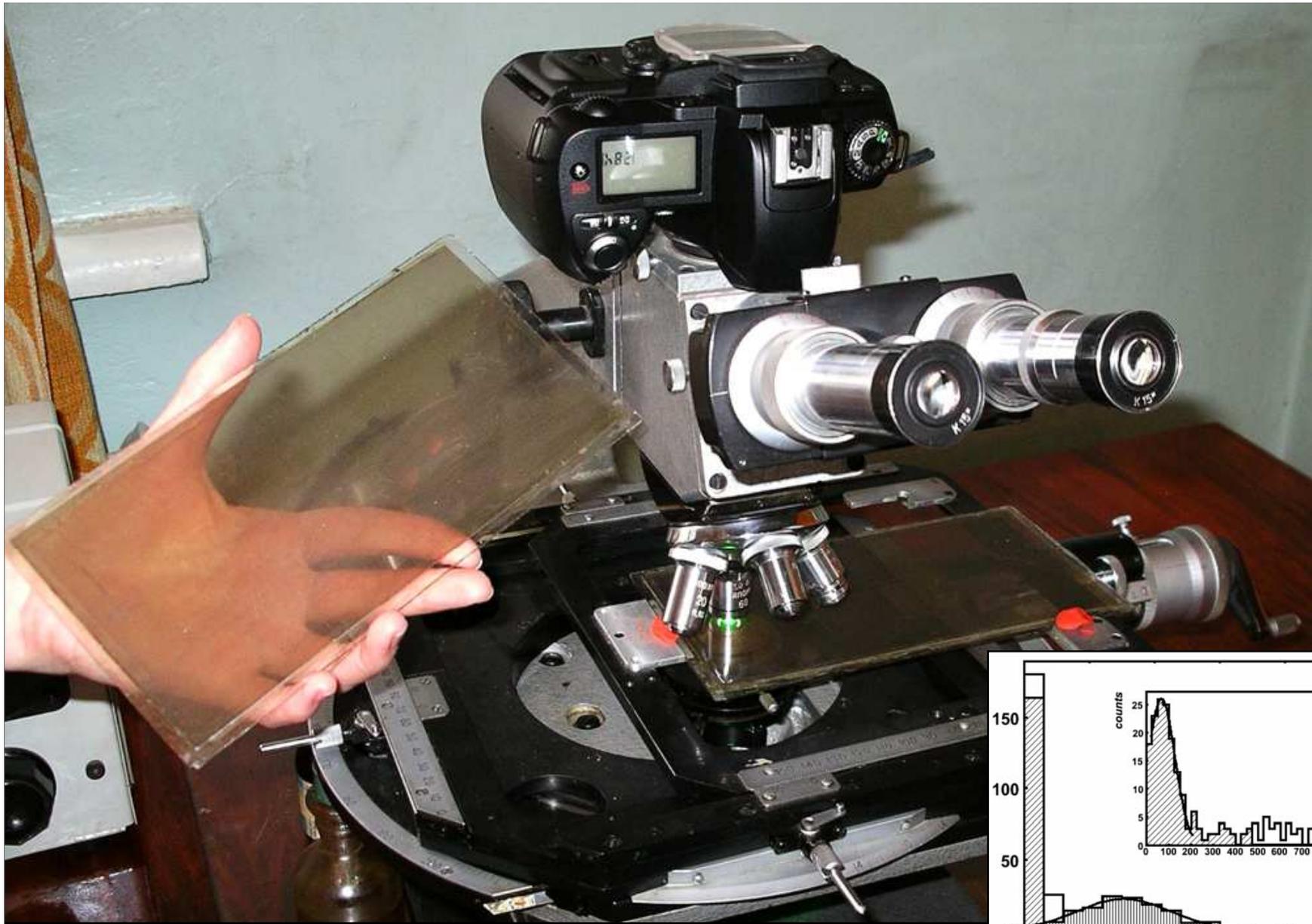
Tracking test by low velocity Kr



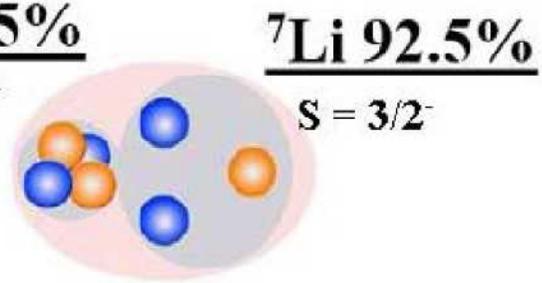
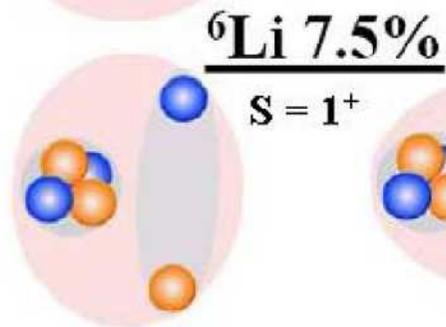
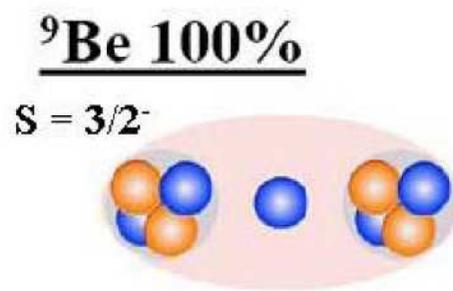
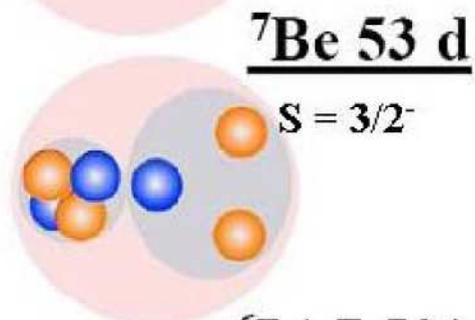
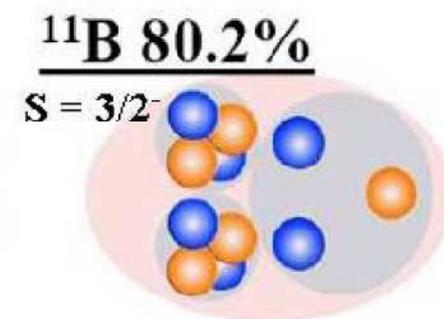
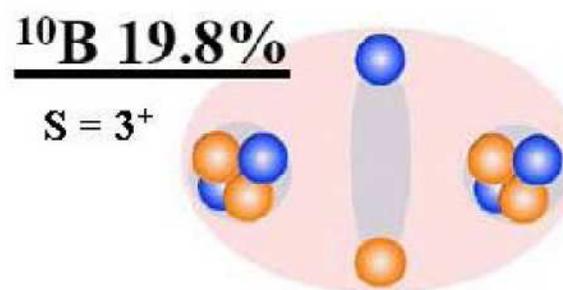
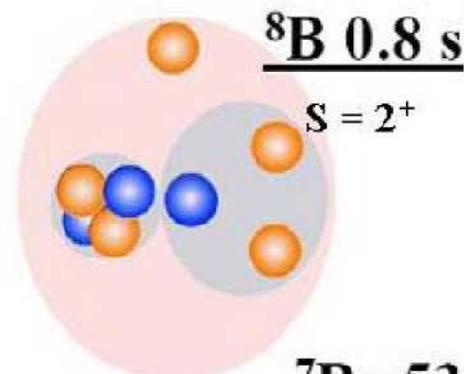
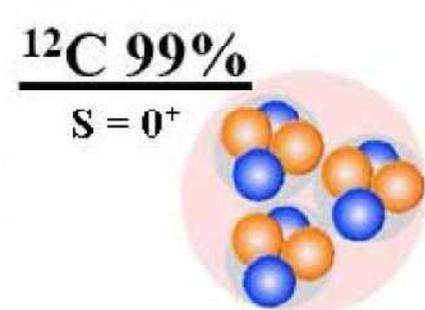
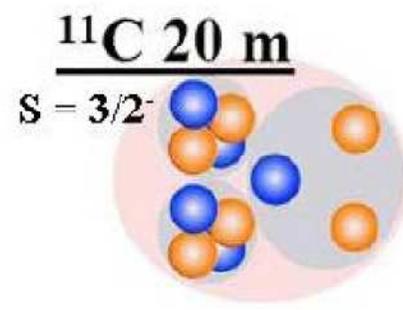
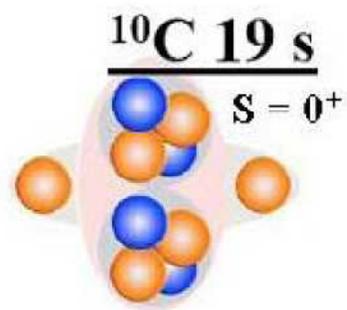
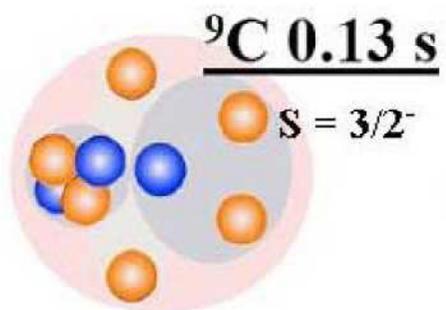
Sensitivity control of NIT



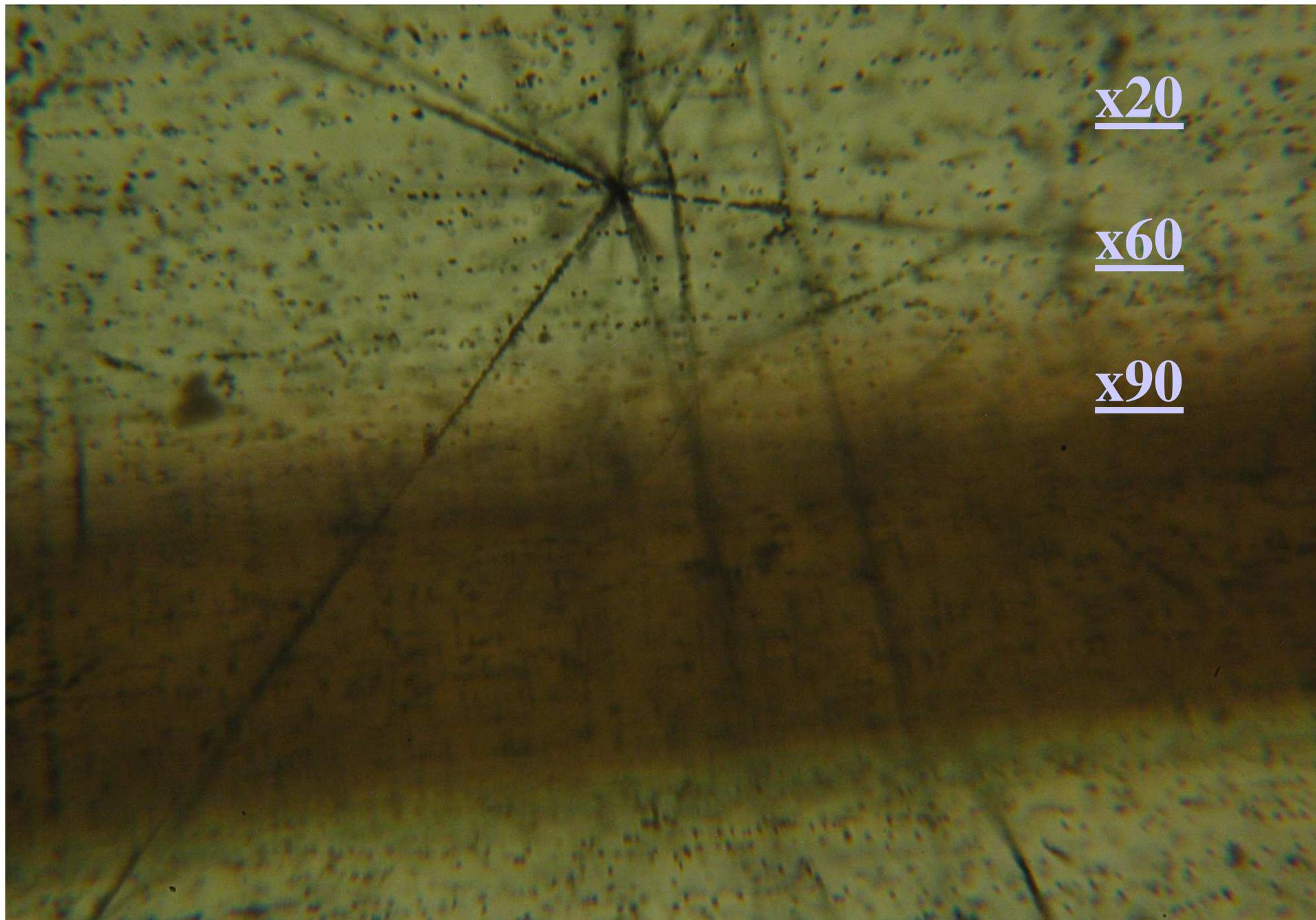
β⁰ γ rejection power (²⁴¹Am γ ray test)
⇒ Rejection < 10E-5 (manual determination)



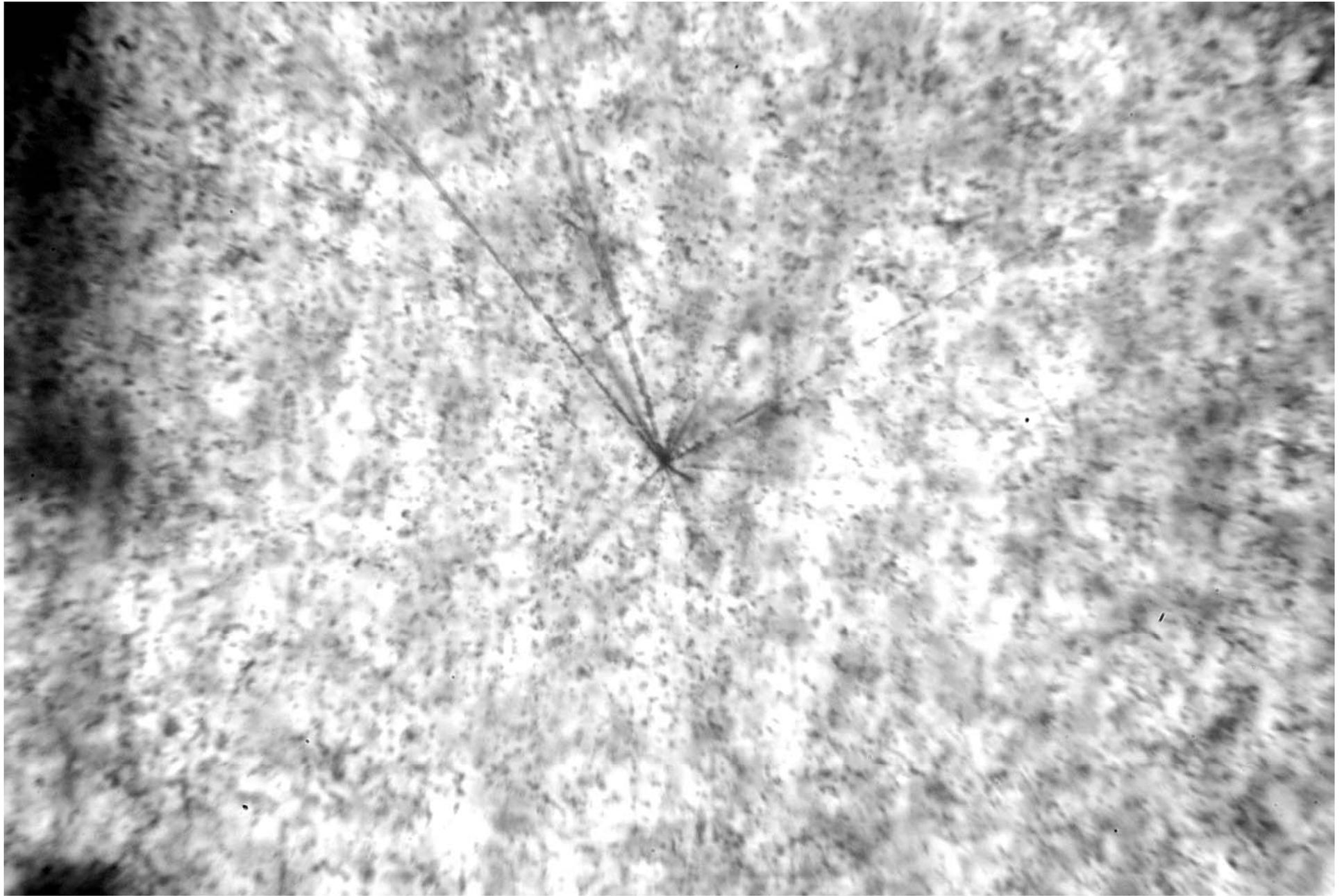
$2A \text{ GeV}/c \text{ } ^9\text{Be} \rightarrow 2\alpha$ "white" star



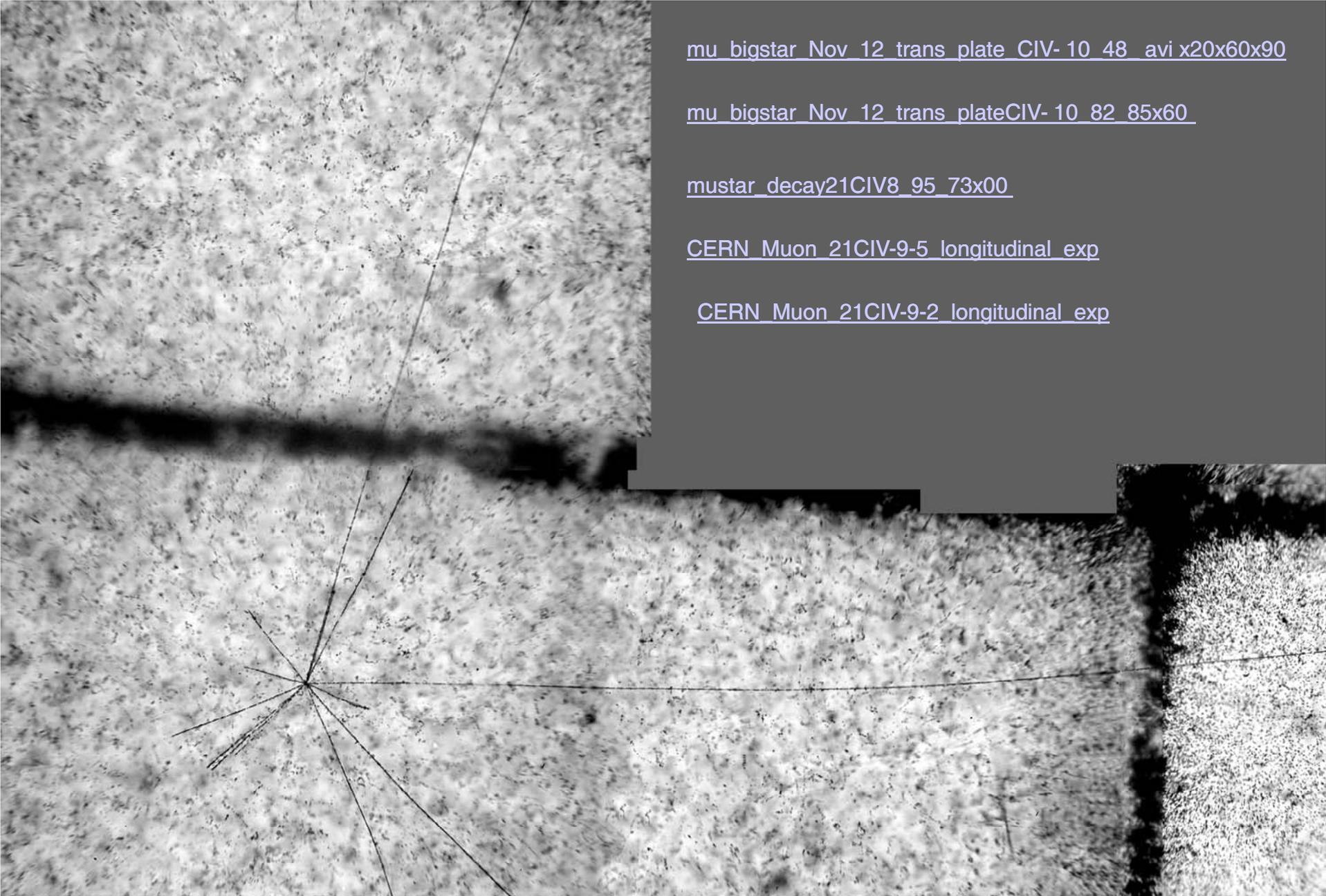




ИФВЭ, апрель 2011 г.: адроны 6 ГэВ



ЦЕРН, декабрь 21012 г.: μ -мезоны 160 ГэВ



[mu bigstar Nov 12 trans plate CIV- 10 48 avi x20x60x90](#)

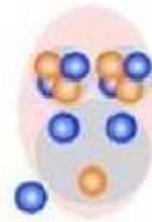
[mu bigstar Nov 12 trans plate CIV- 10 82 85x60](#)

[mustar_decay21CIV8 95 73x00](#)

[CERN Muon 21CIV-9-5 longitudinal exp](#)

[CERN Muon 21CIV-9-2 longitudinal exp](#)

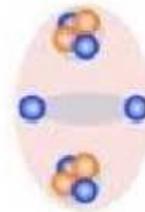
^{12}B 20 ms



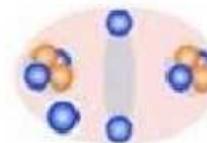
^{12}Be 23 ms



^{10}Be 1510000 y



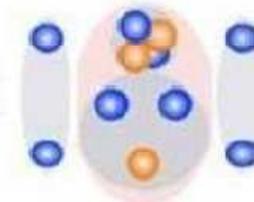
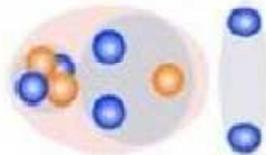
^{11}Be 13.8 s



^8Li 838 ms

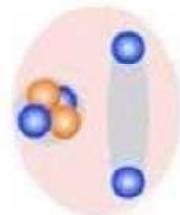


^9Li 178 ms

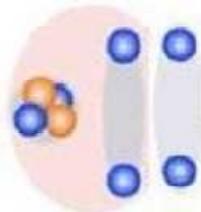


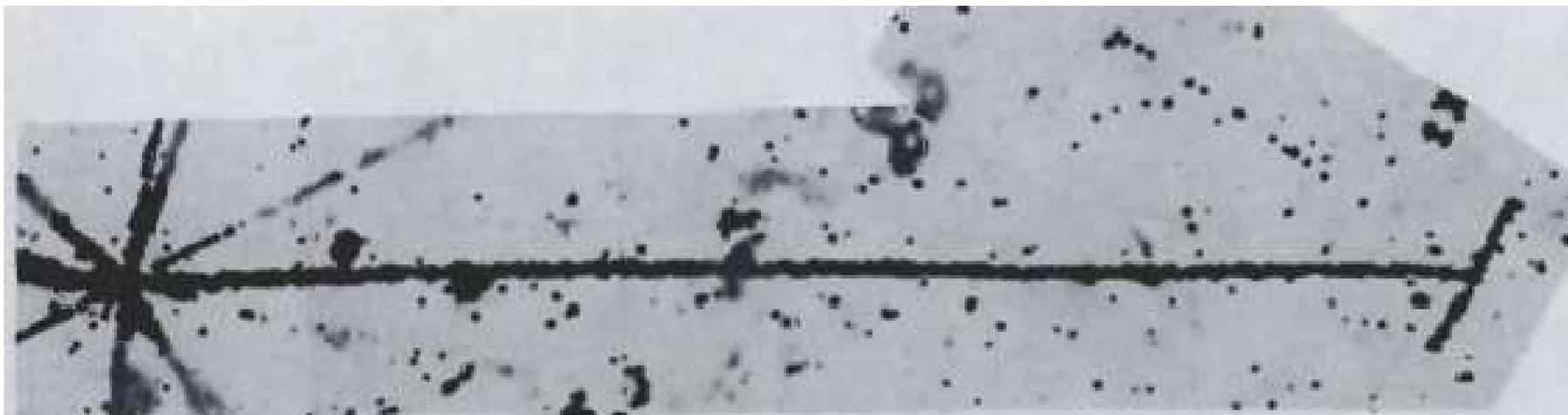
^{11}Li 8.5 ms

^6He 807 ms



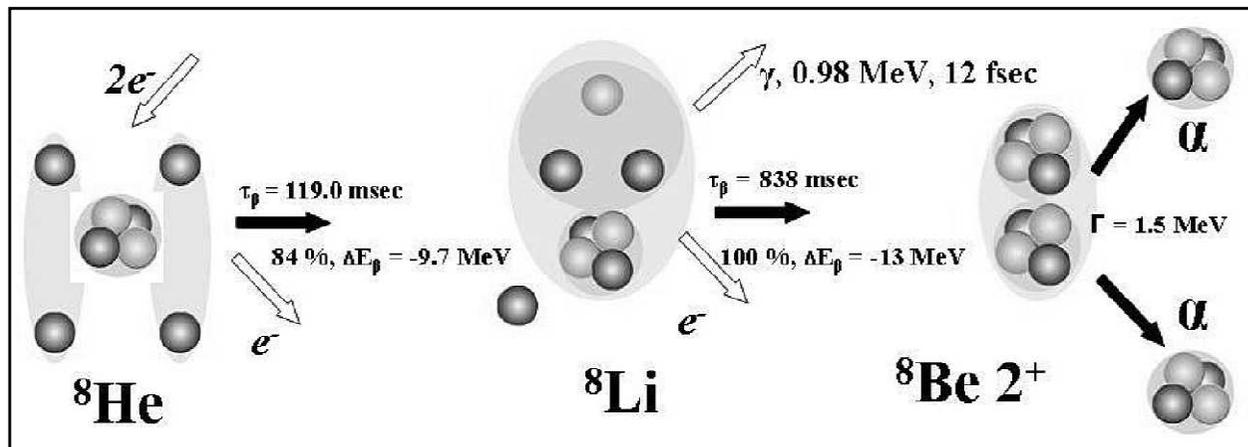
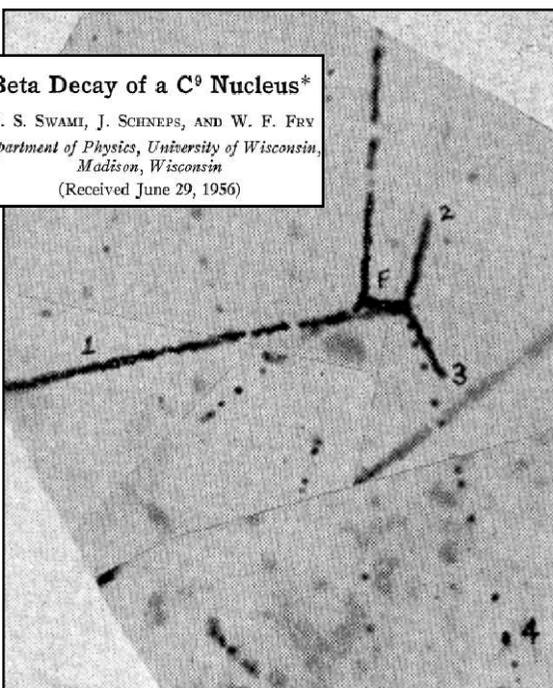
^8He 119 ms

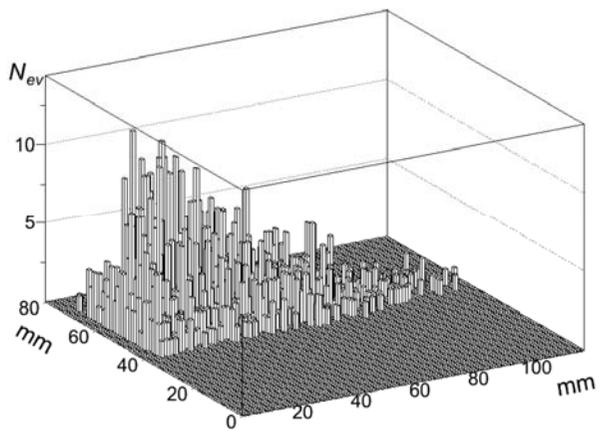
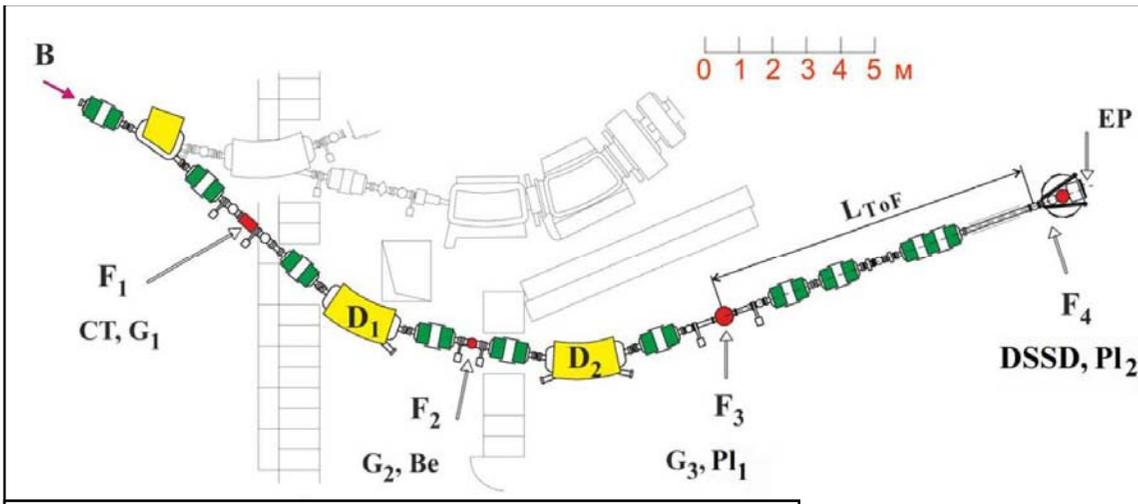




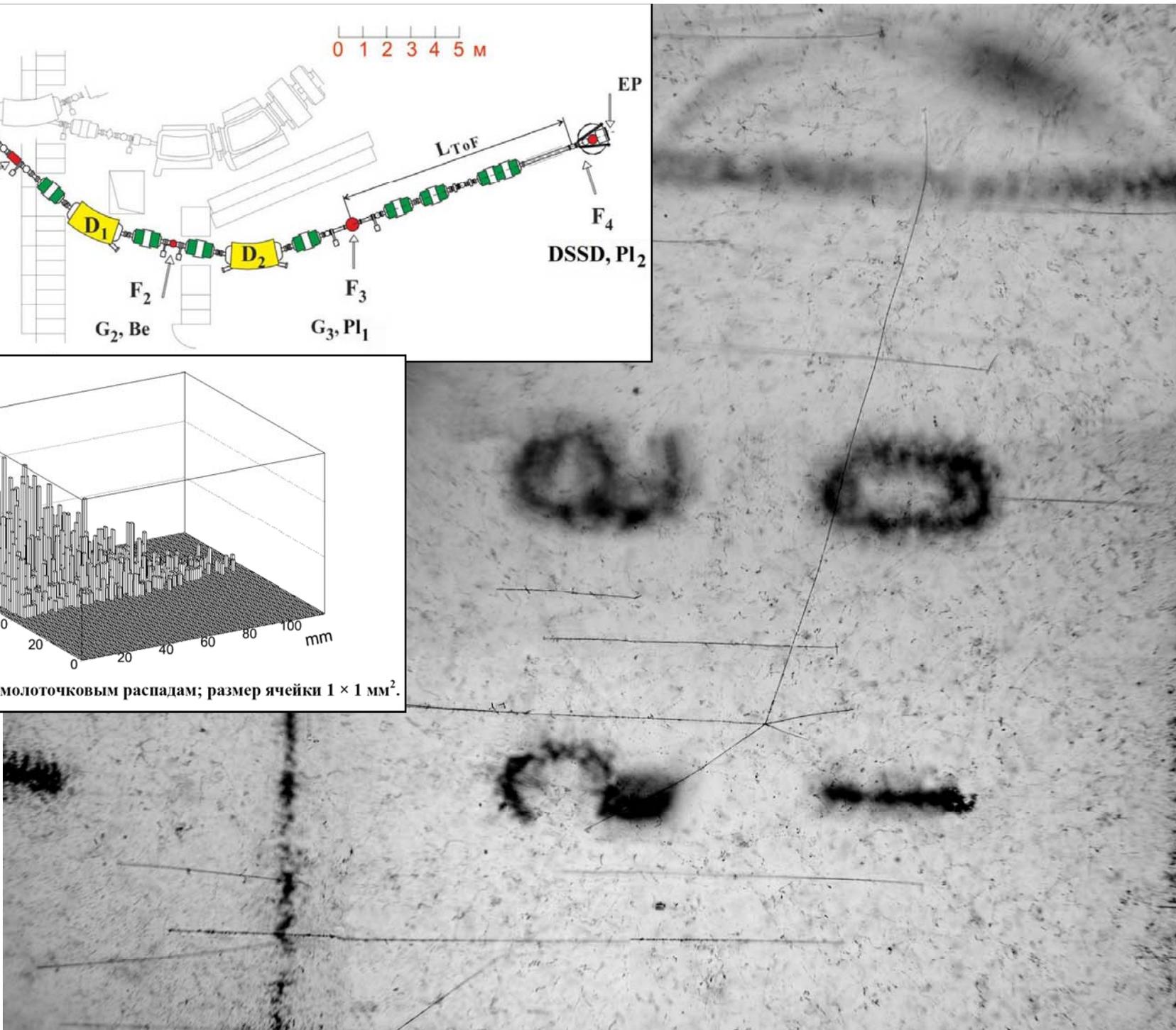
Более полувека назад наблюдались «молоточковые» следы распадов ${}^8\text{Be} \rightarrow 2\alpha$ от β -распадов остановившихся фрагментов ${}^8\text{Li}$ и ${}^8\text{B}$, рожденных в свою очередь частицами высоких энергий при расщеплении ядер из состава эмульсии.

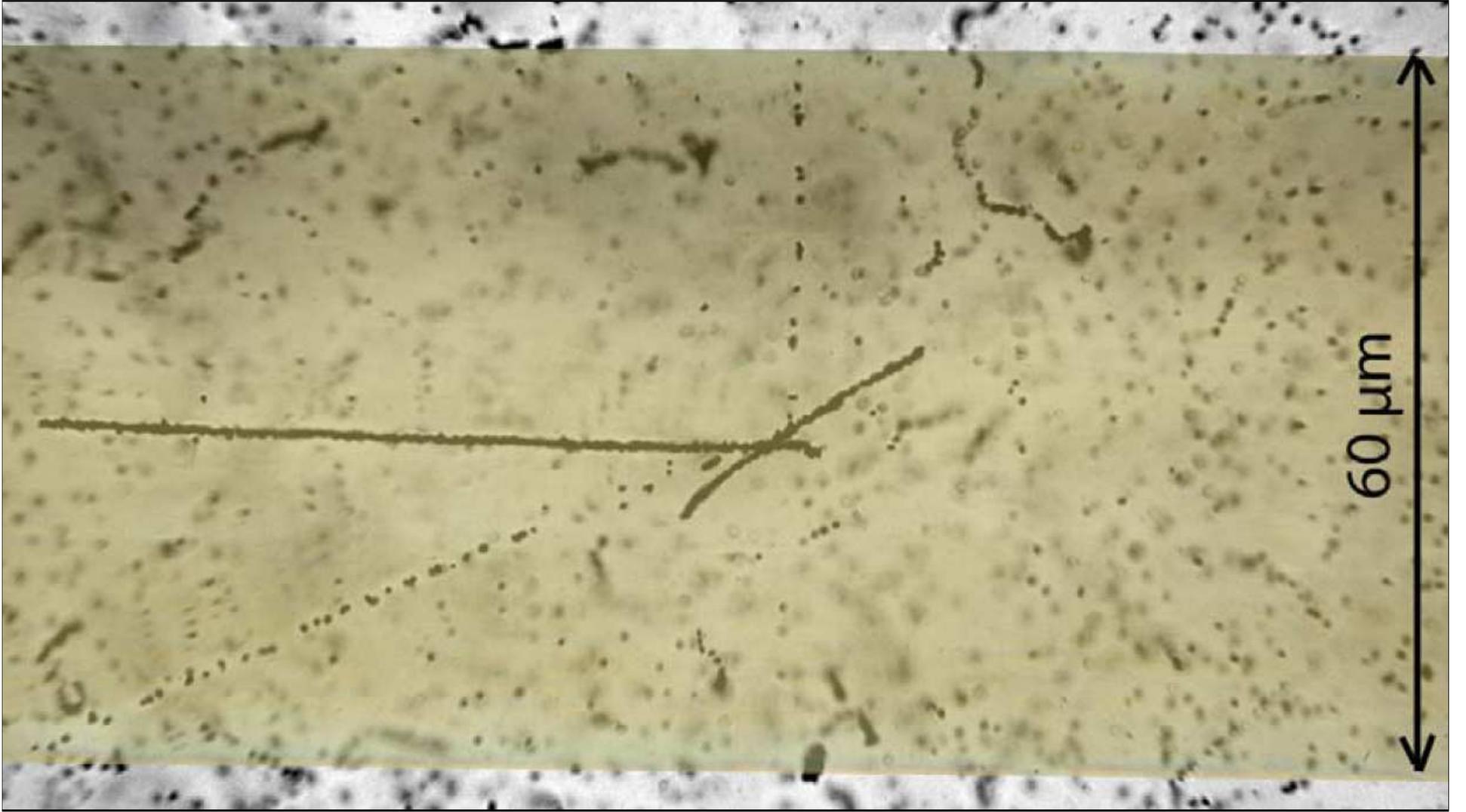
Beta Decay of a C^{13} Nucleus*
 M. S. SWAMI, J. SCHNEPS, AND W. F. FRY
 Department of Physics, University of Wisconsin,
 Madison, Wisconsin
 (Received June 29, 1956)

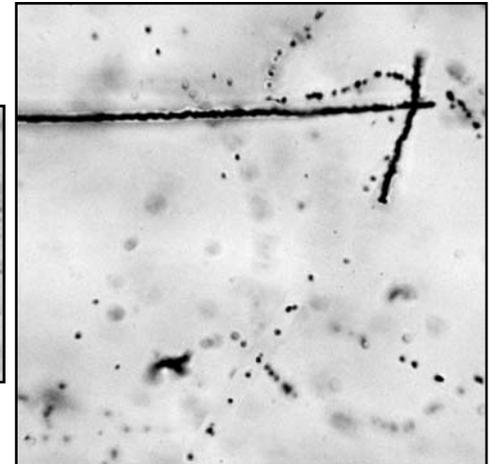
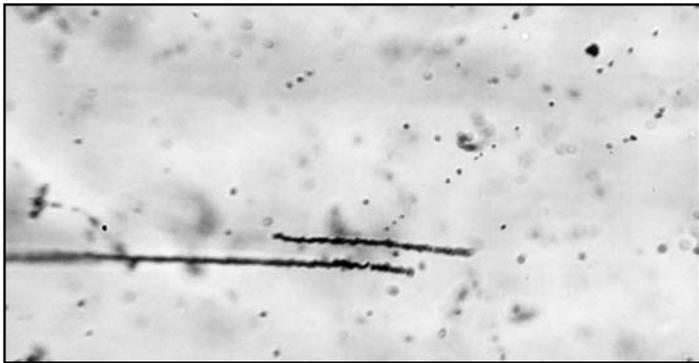
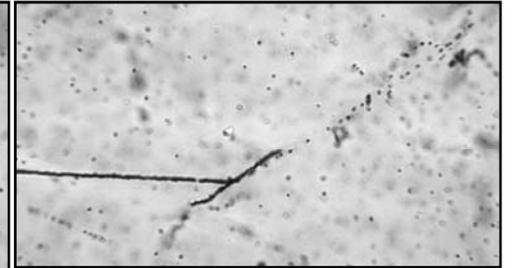
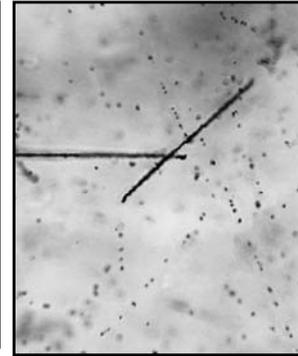
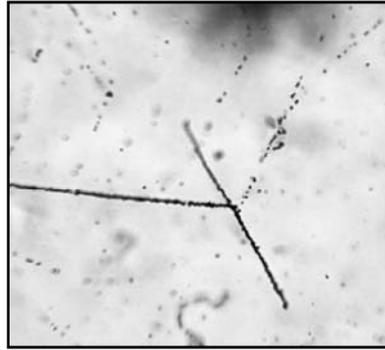
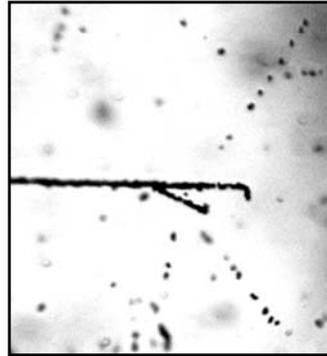
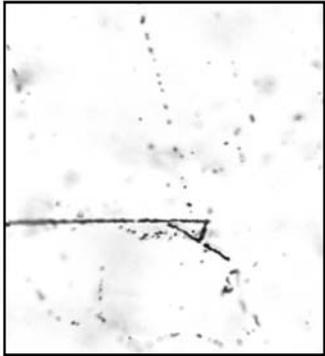
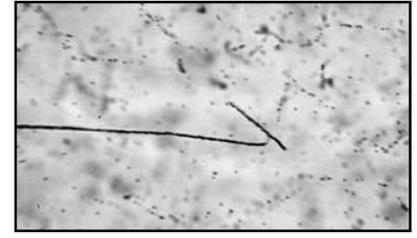
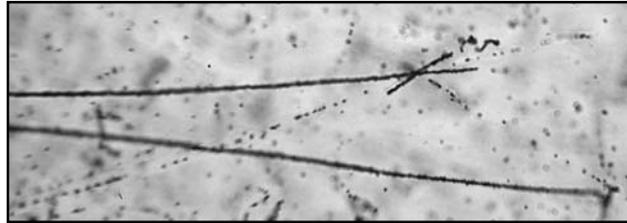
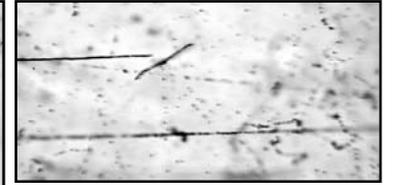
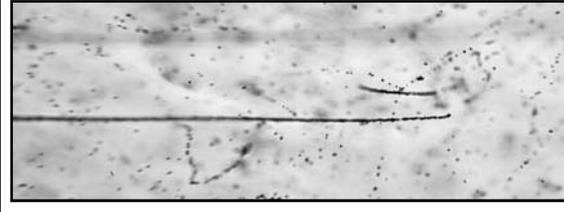
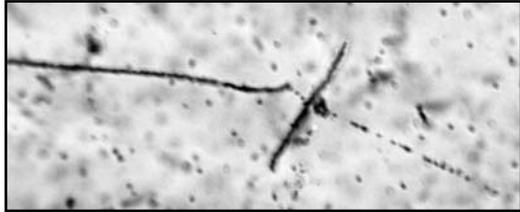
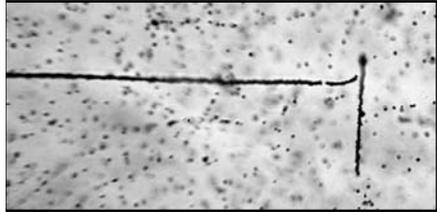
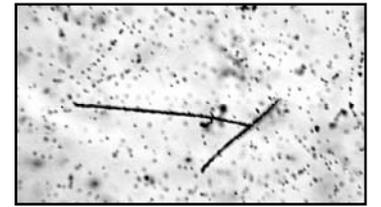
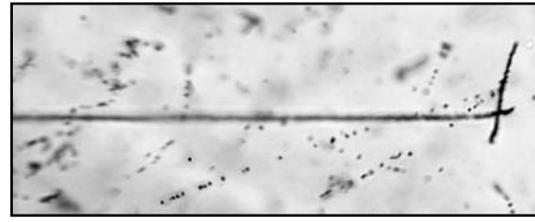
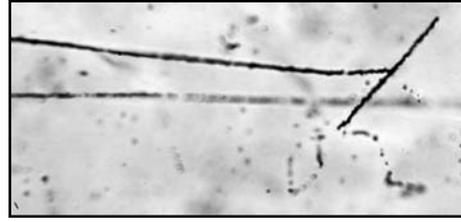
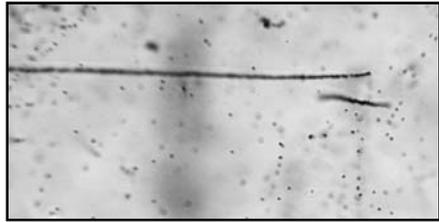


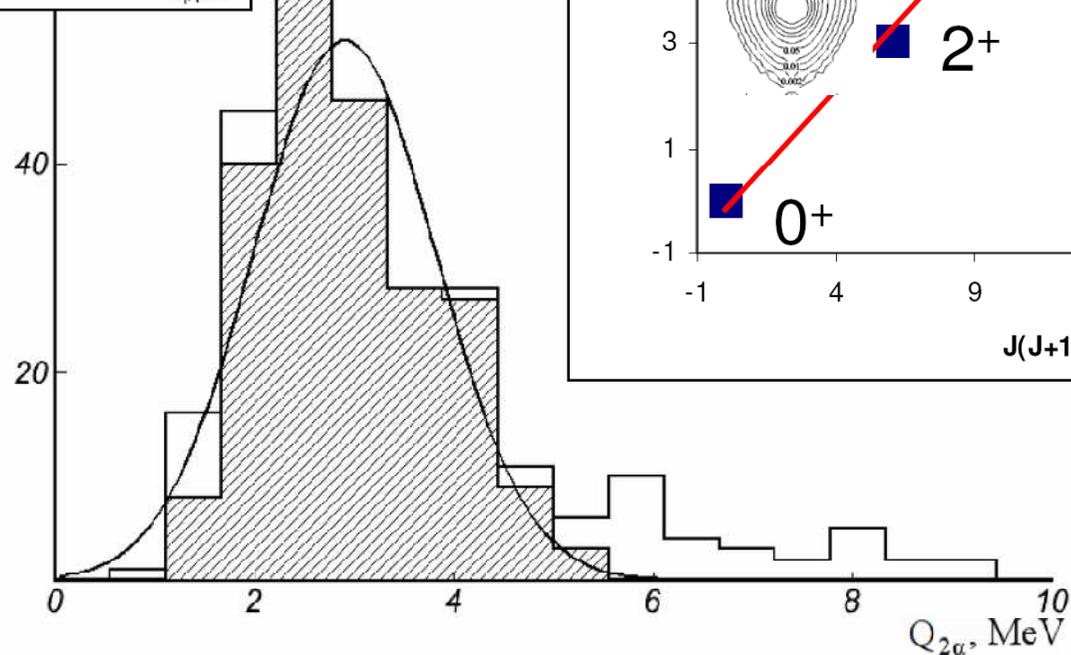
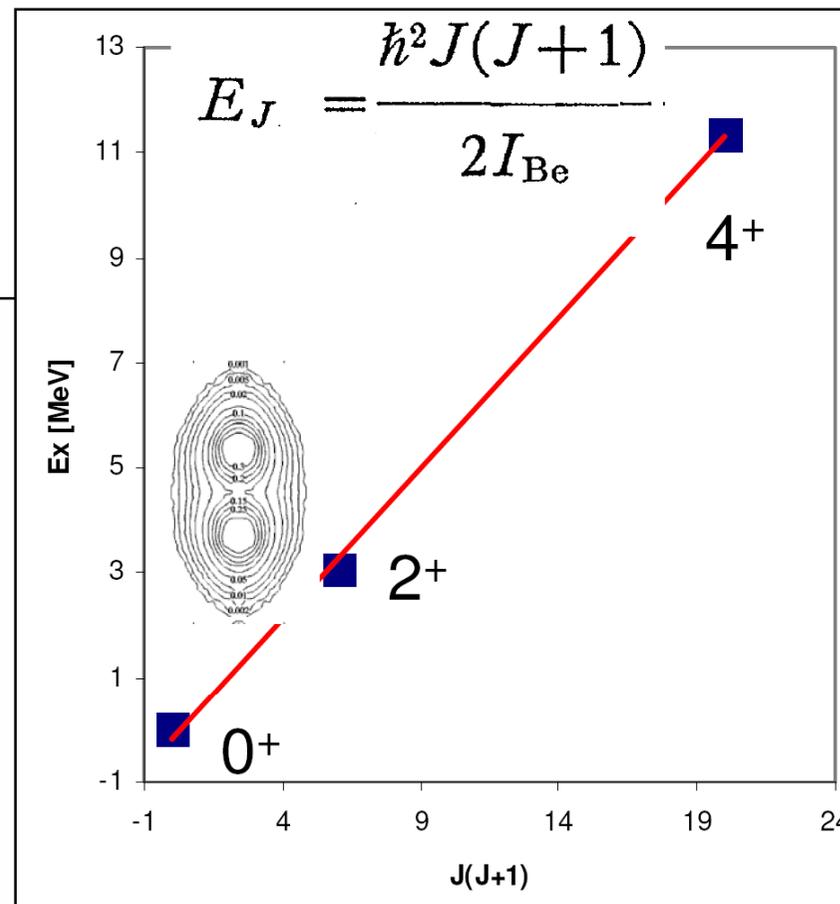
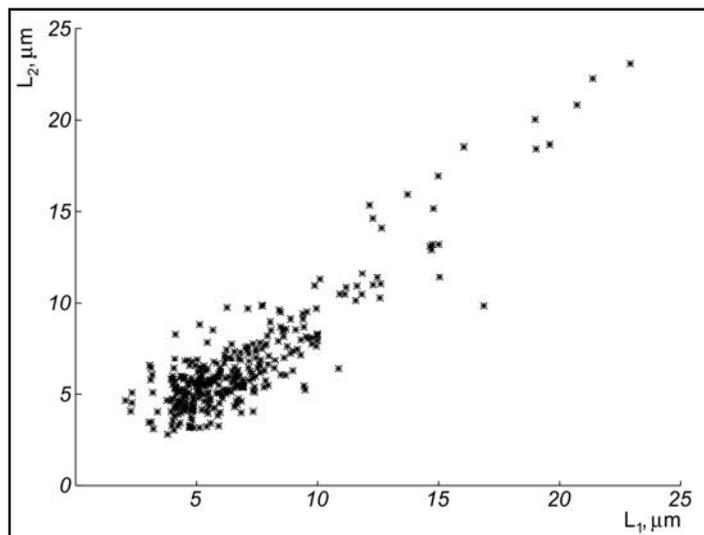


Профиль пучка по молоточковым распадам; размер ячейки $1 \times 1 \text{ мм}^2$.



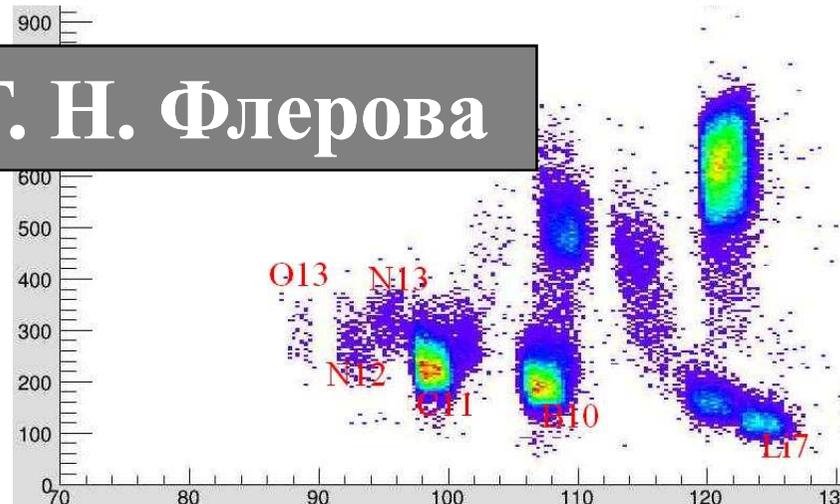




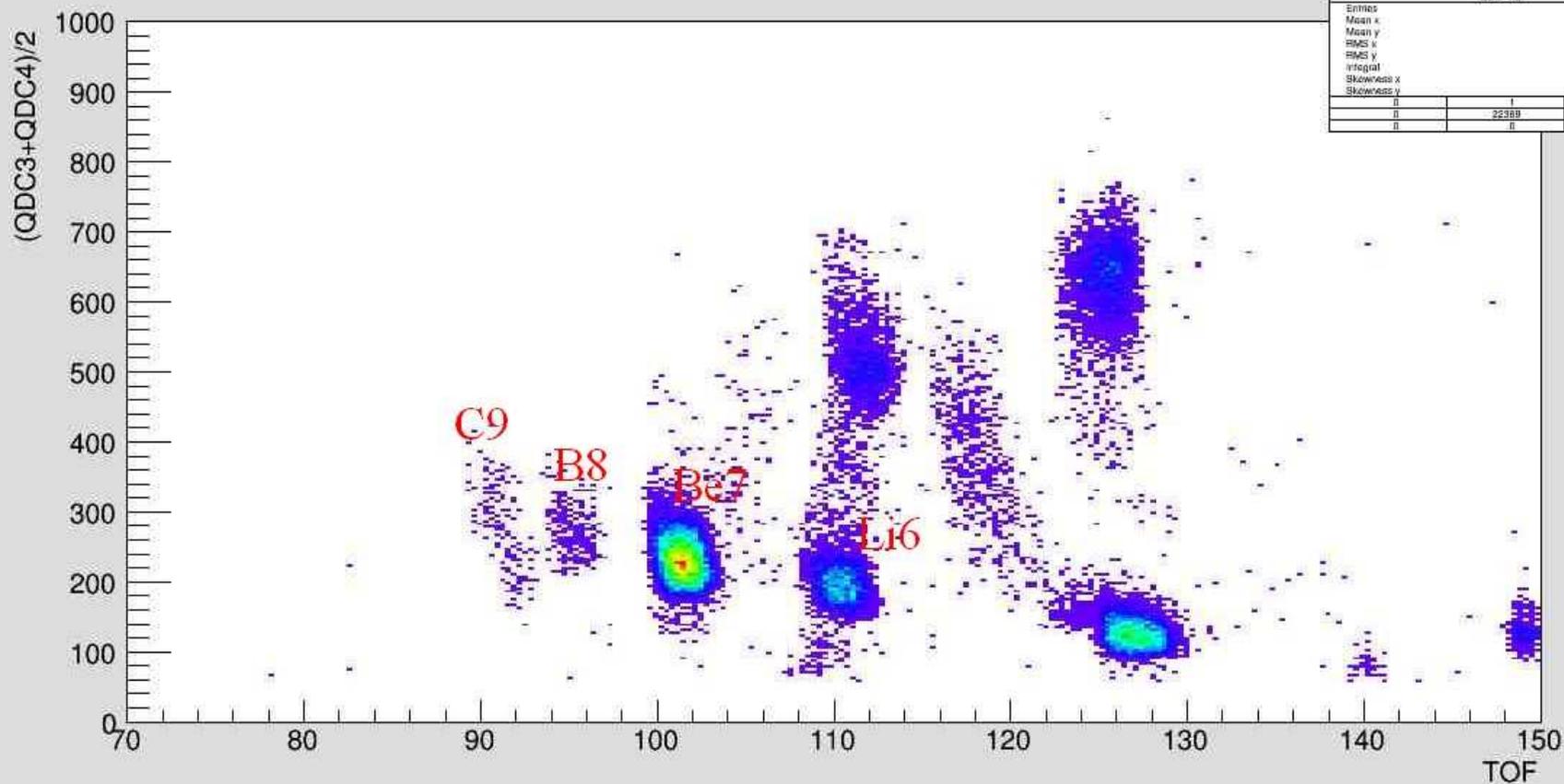


Распределение по величине энергии $Q_{2\alpha}$ пары α -частиц; отвечающих условиям отбора событий L_1 и $L_2 < 12.5 \mu\text{м}$, $\Theta > 145^\circ$; линия описание функцией Гаусса.

5 мая 2013 г., ЛЯР имени Г. Н. Флерова

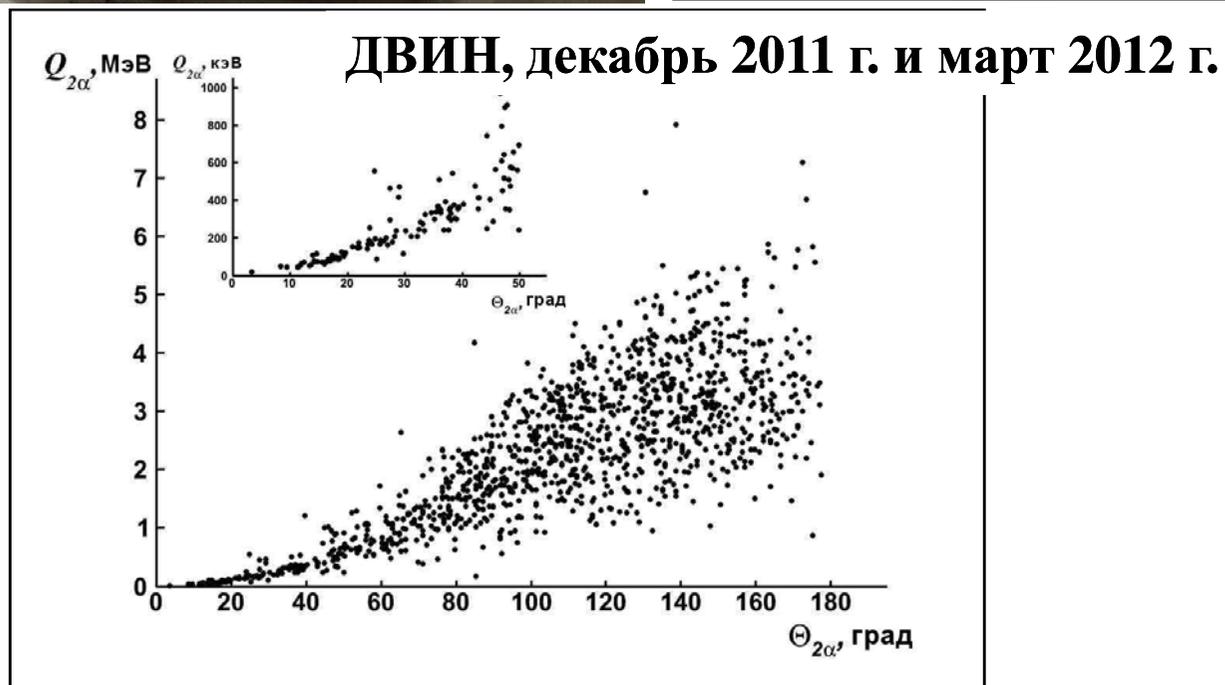
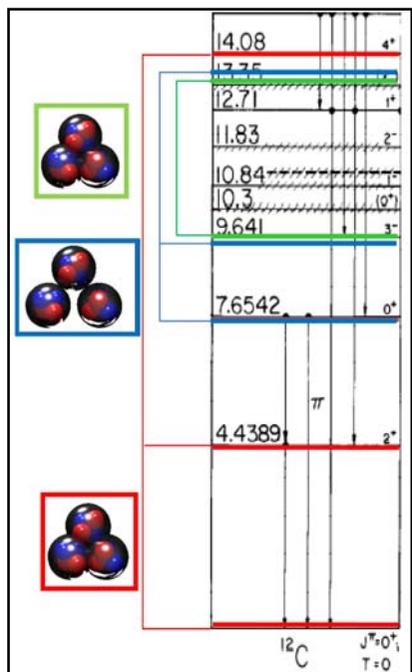
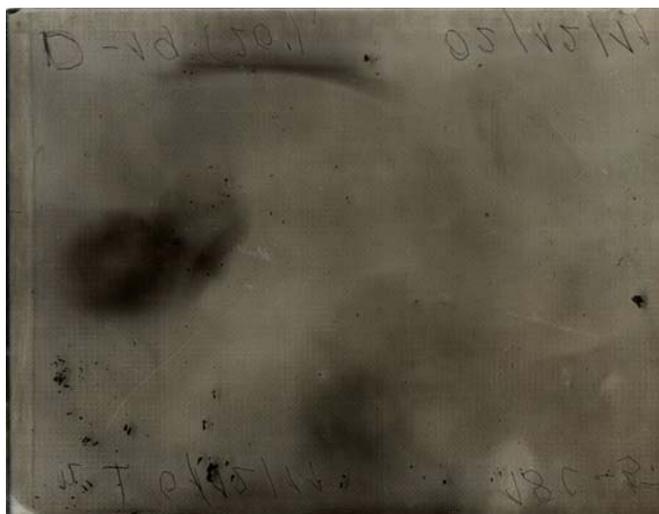
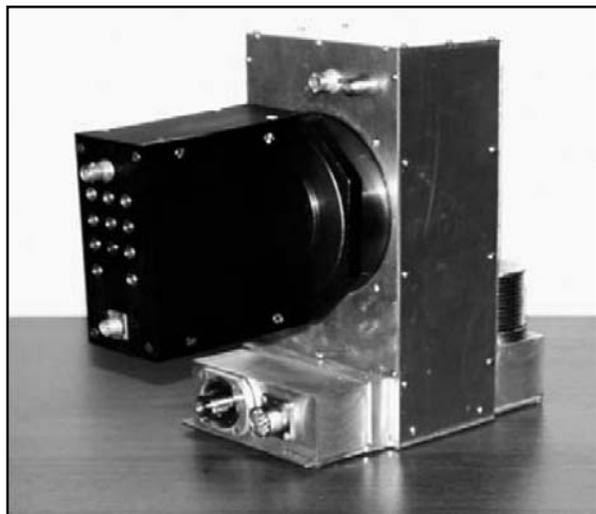


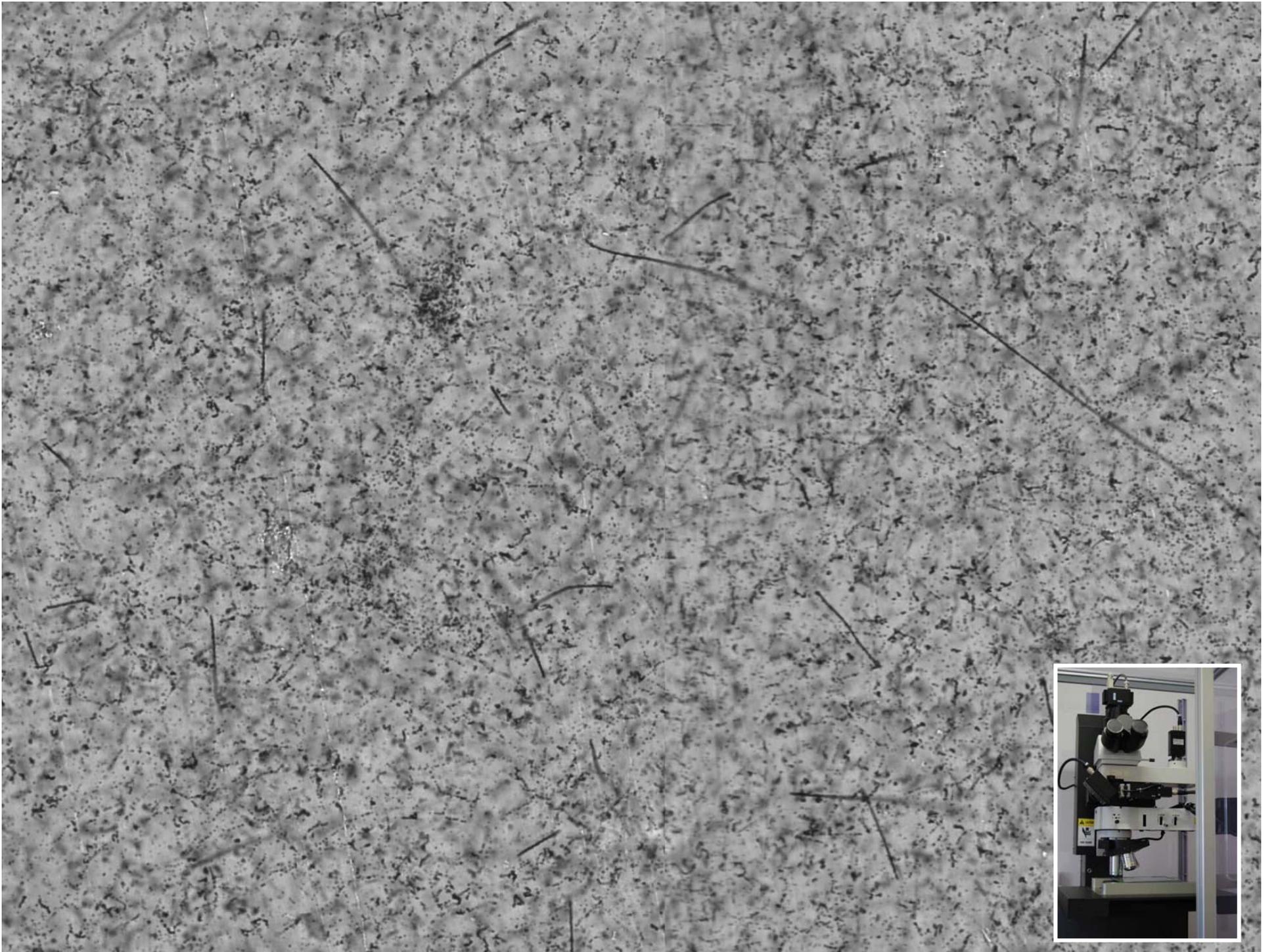
(QDC3+QDC4)/2 vs TOF 02:12:30 2013-05-13 Analysis/Histograms/ESUM/QDC_TOF

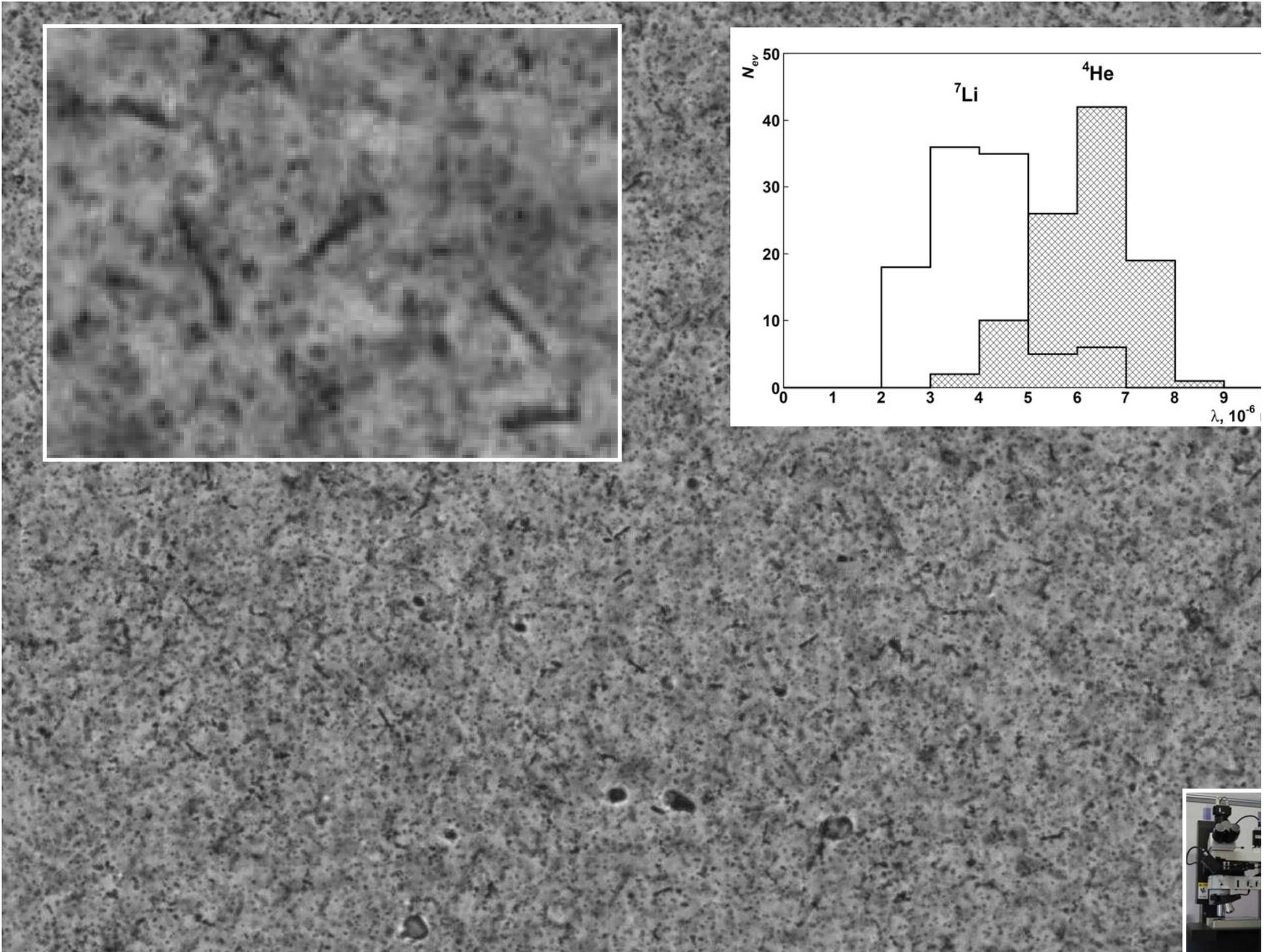


QDC_TOF		
Entries	22473	
Mean x	113	
Mean y	384.1	
RMS x	11.89	
RMS y	170	
Integral	2.237e+04	
Skewness x	0.4895	
Skewness y	1.183	
n	1	n
n	22389	103
n	n	n

Изучение кластерной и спиновой структуры ядра ^{12}C методом ядерной эмульсии облученной нейтронами с энергией 14 МэВ



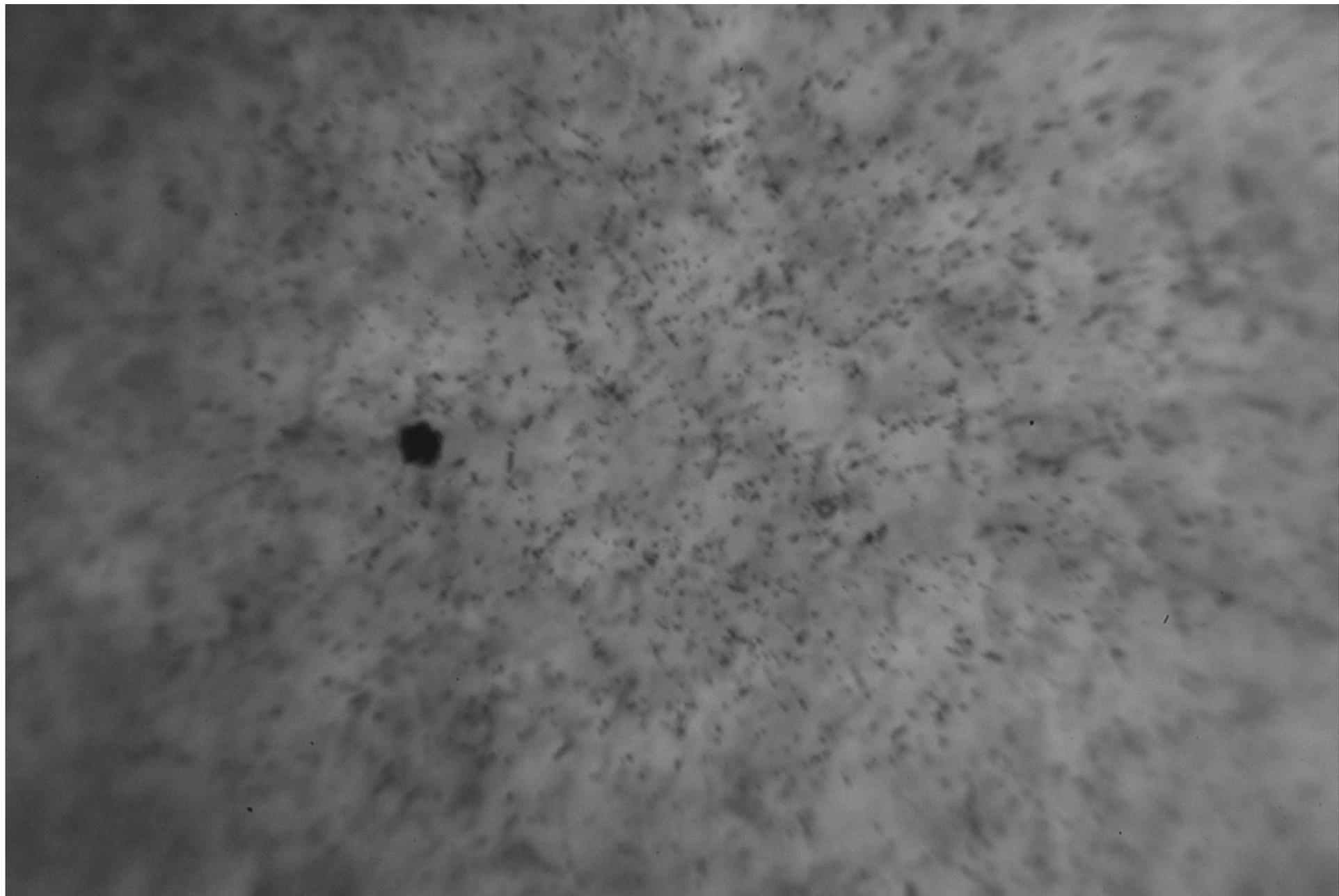


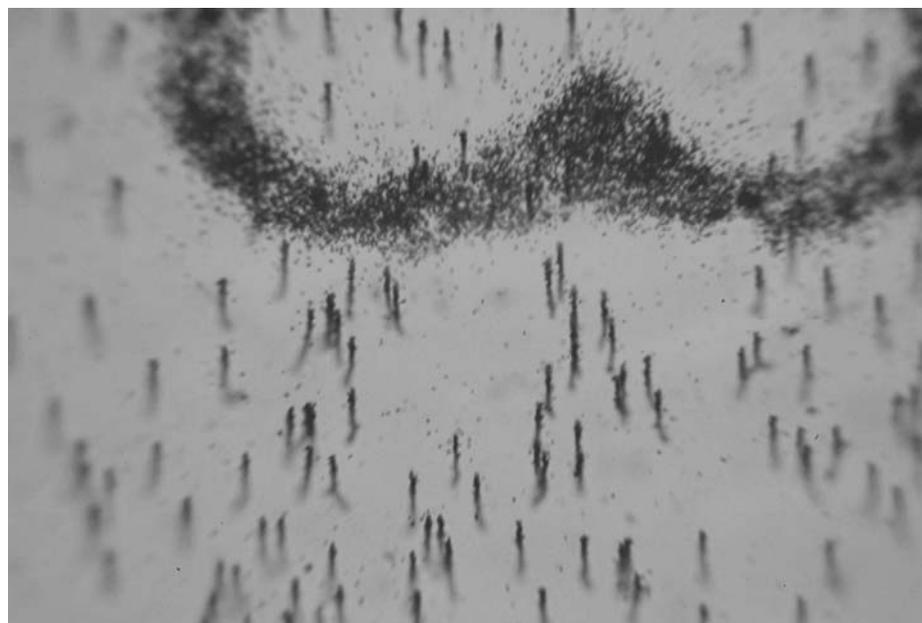
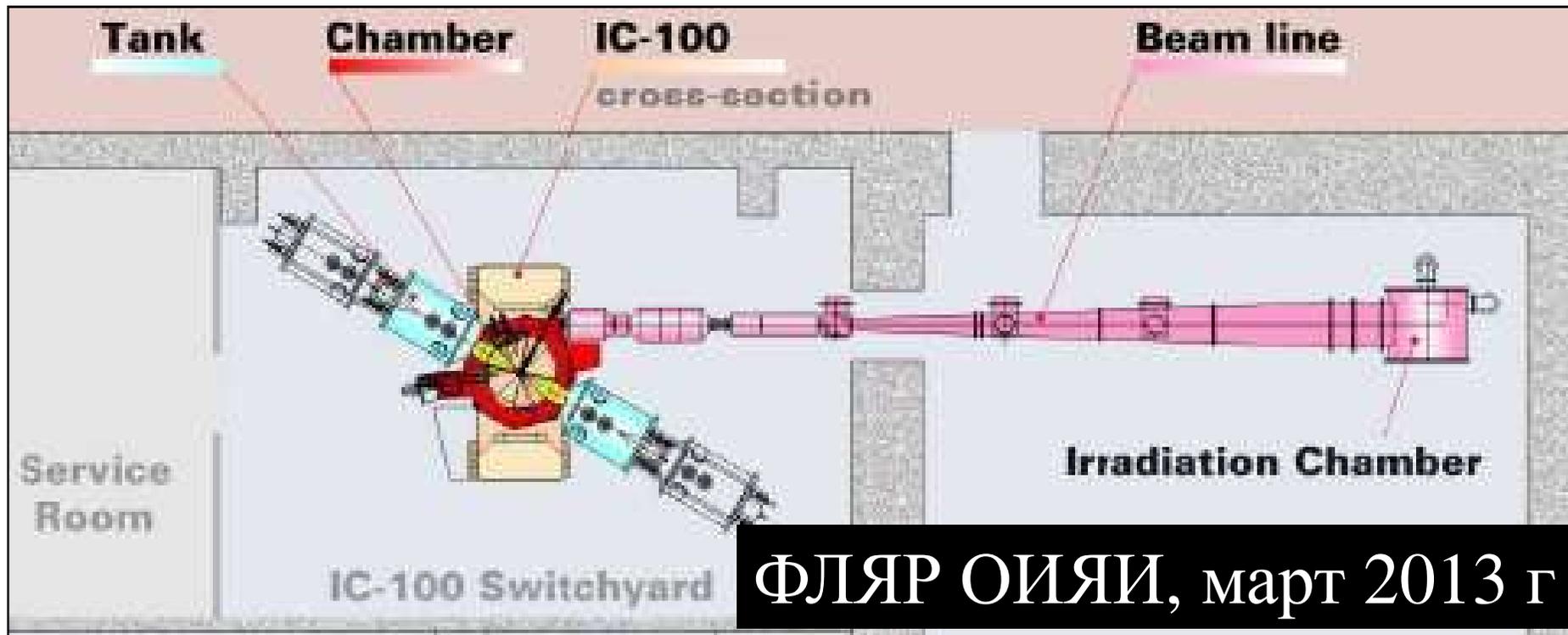


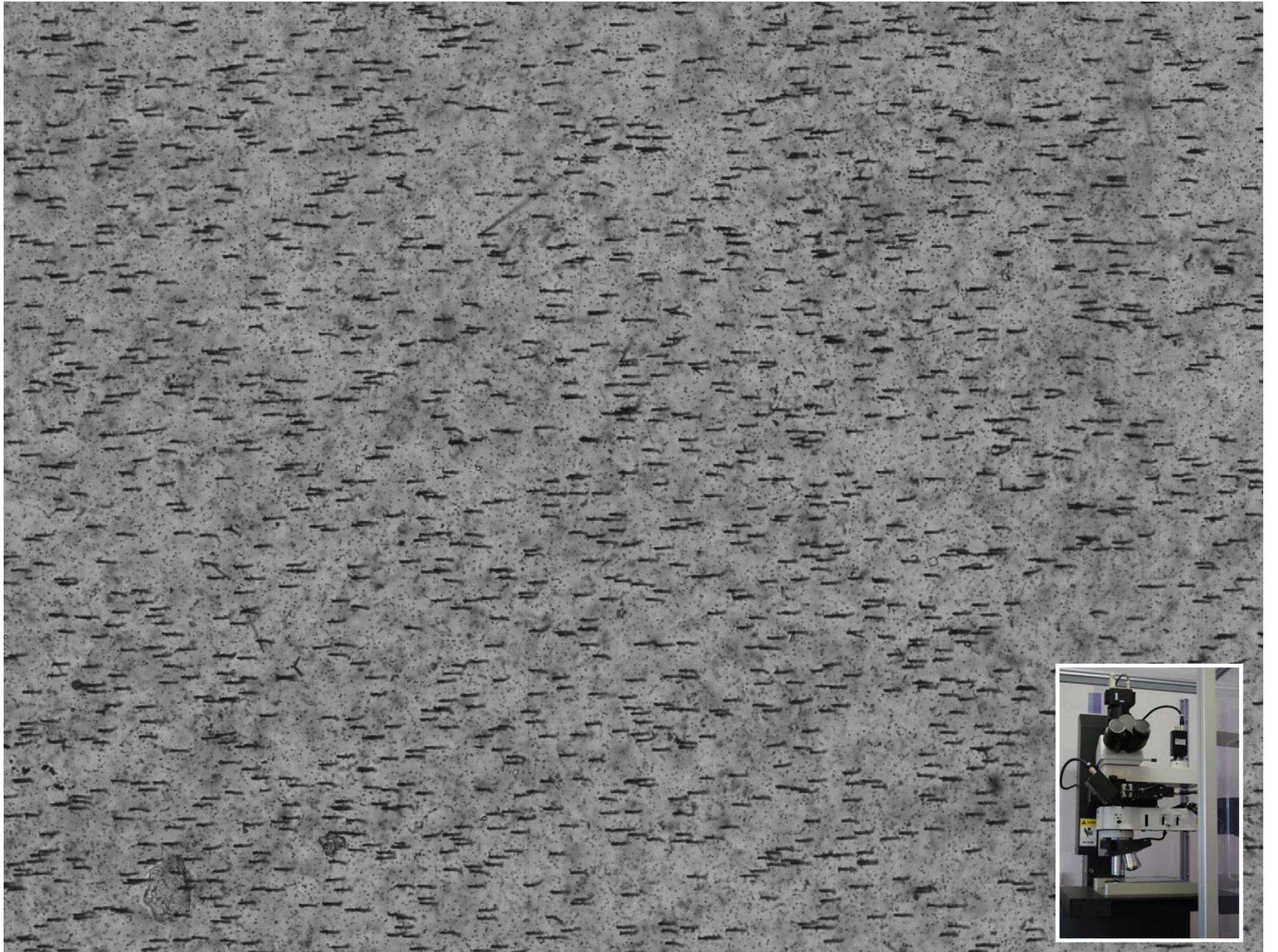
ИБР-2, декабрь 2012 г., тепловые нейтроны

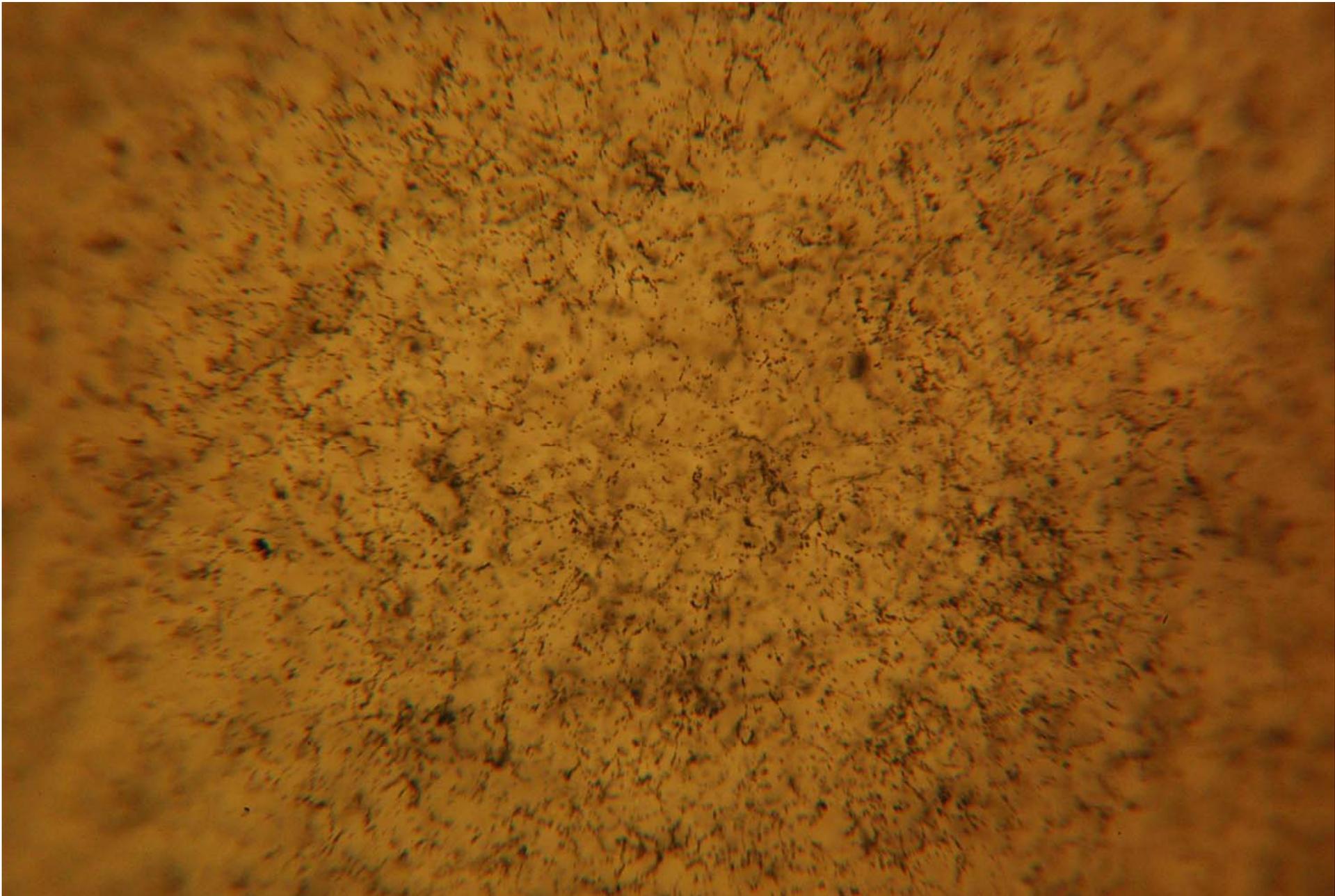
IBR 30m Thermal Neutrons x20











Спасибо за прекрасную работу,

дорогая Вера Яновна!

С Днем рождения!