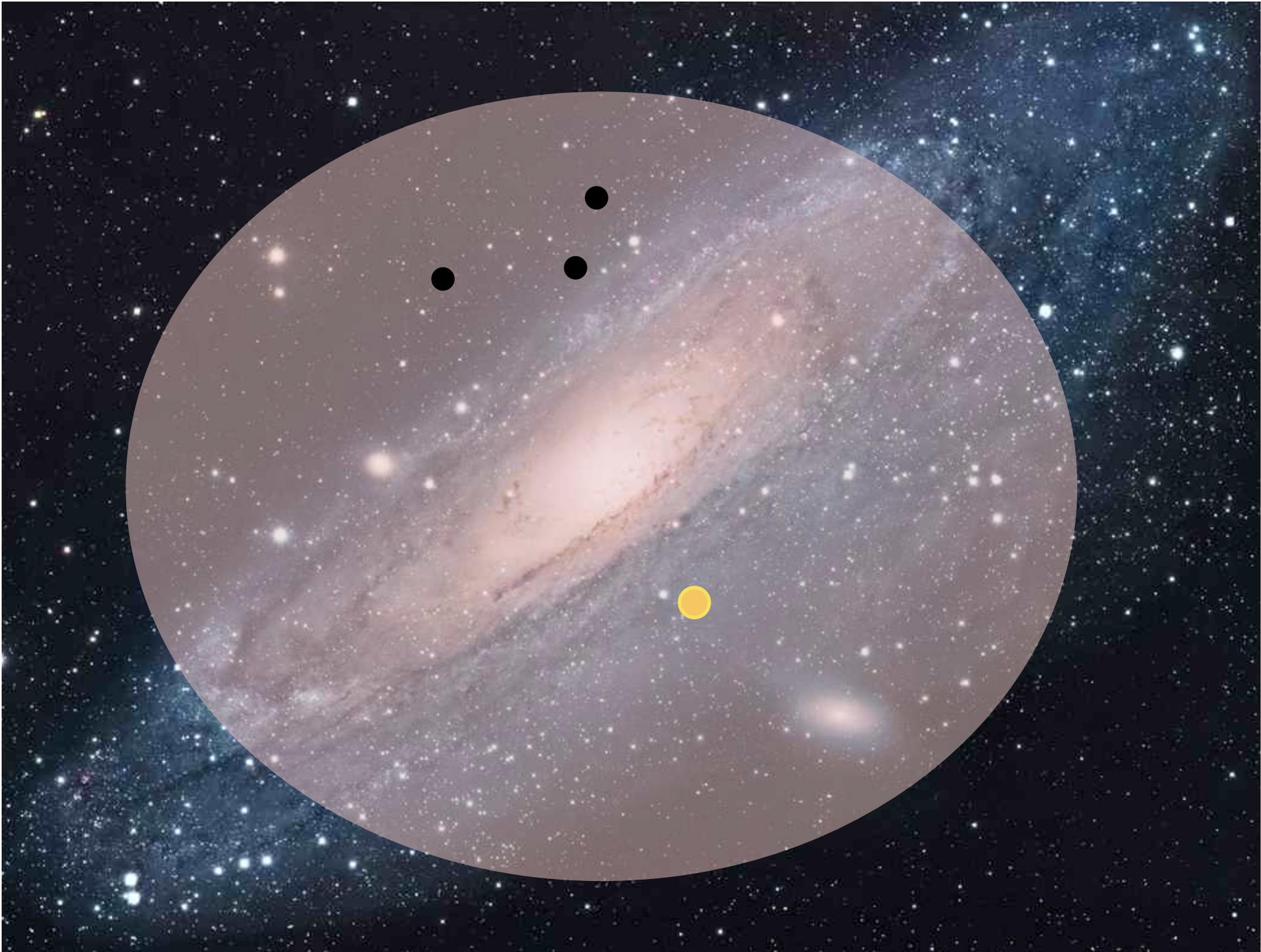


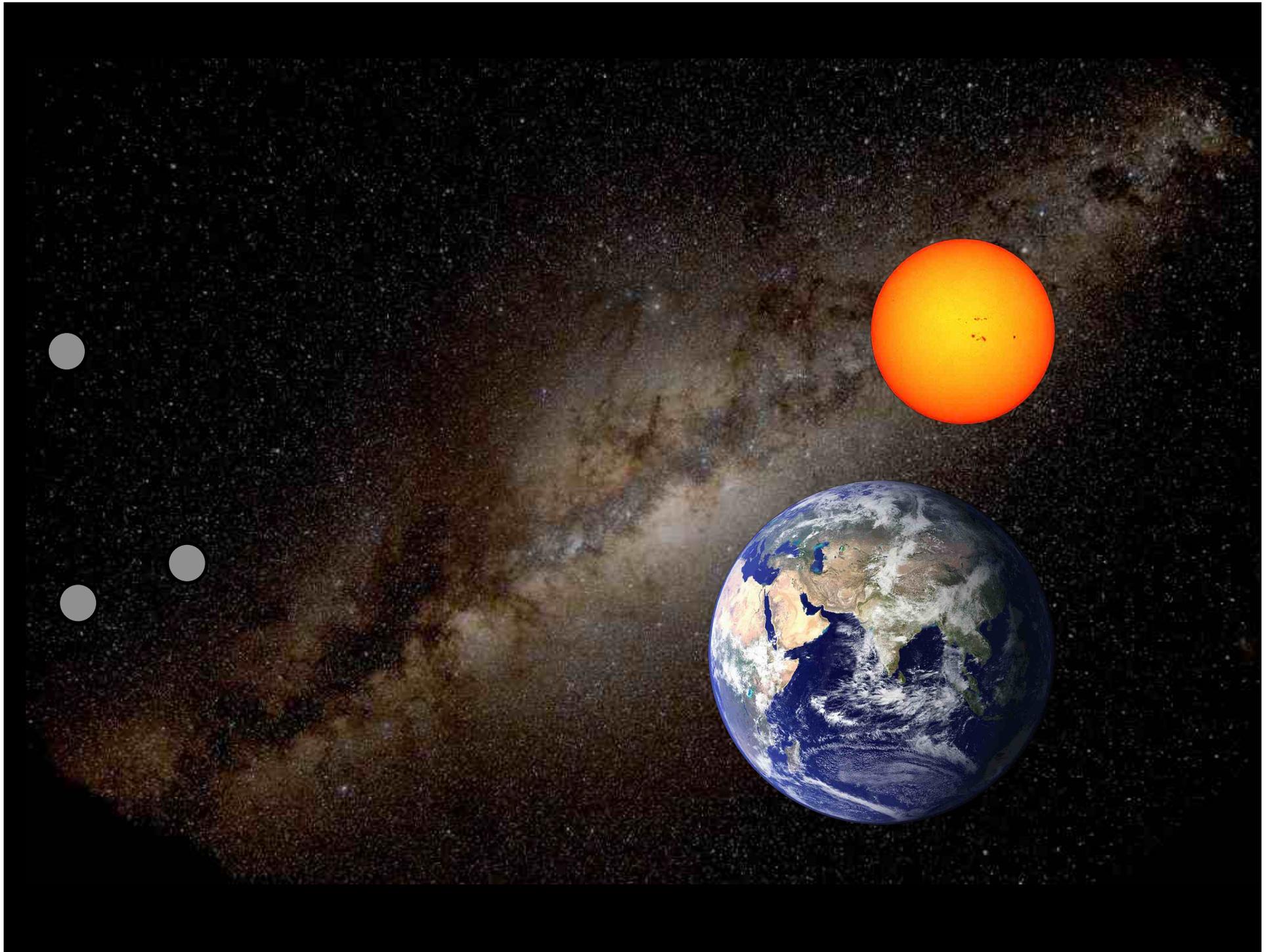


Das XENON100 Experiment  
zum Nachweis

# Dunkler Materie

STATEBOURNE  
cryostat 240





Hier Video: Flug nach Gran Sasso

Hier Video: LNGS und Fahrt in den Tunnel



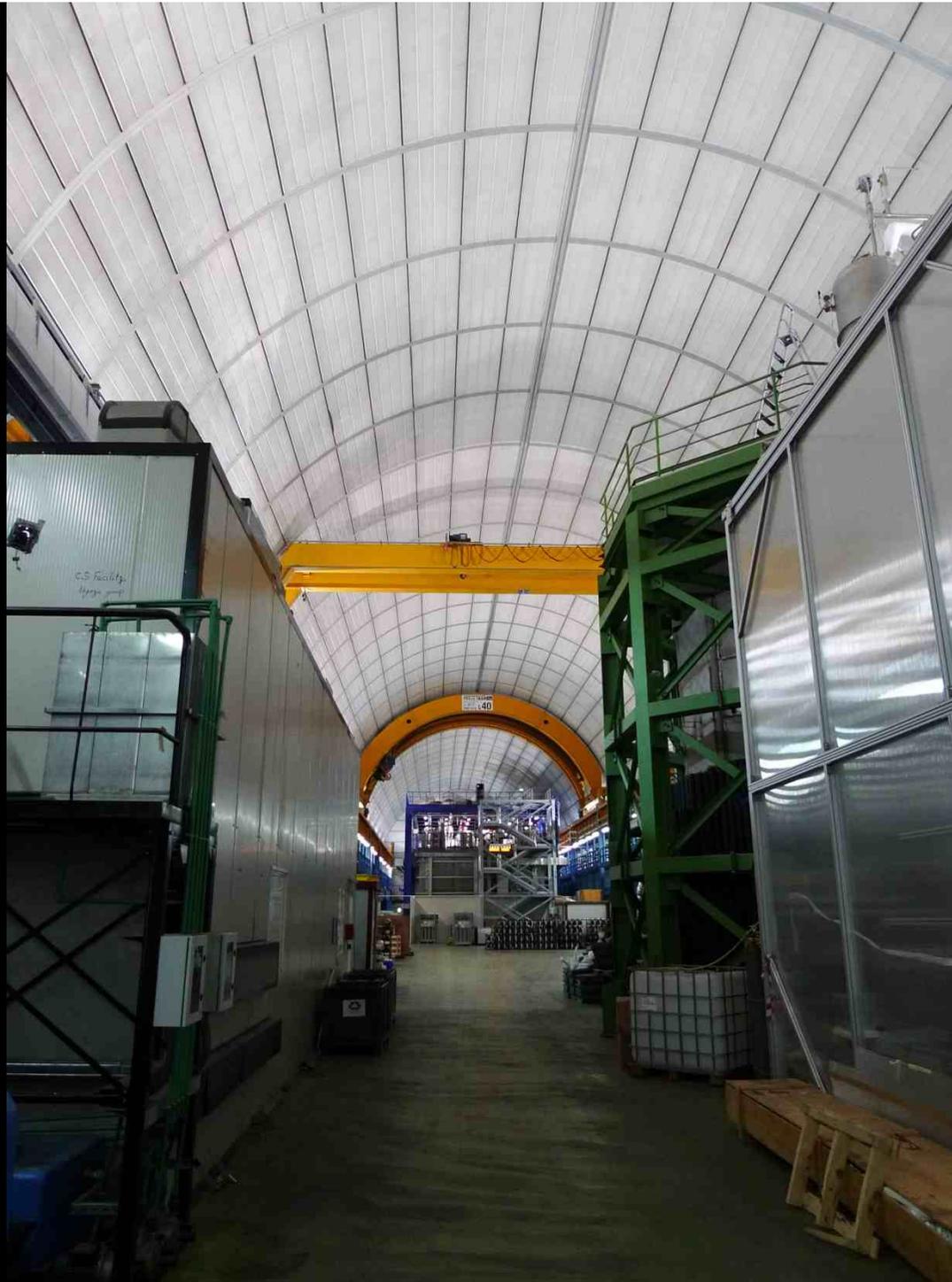
A CO<sub>2</sub>  
N° 50.T.19

USCITA EMERGENZA  
EMERGENCY EXIT

USCITA EMERGENZA  
EMERGENCY EXIT

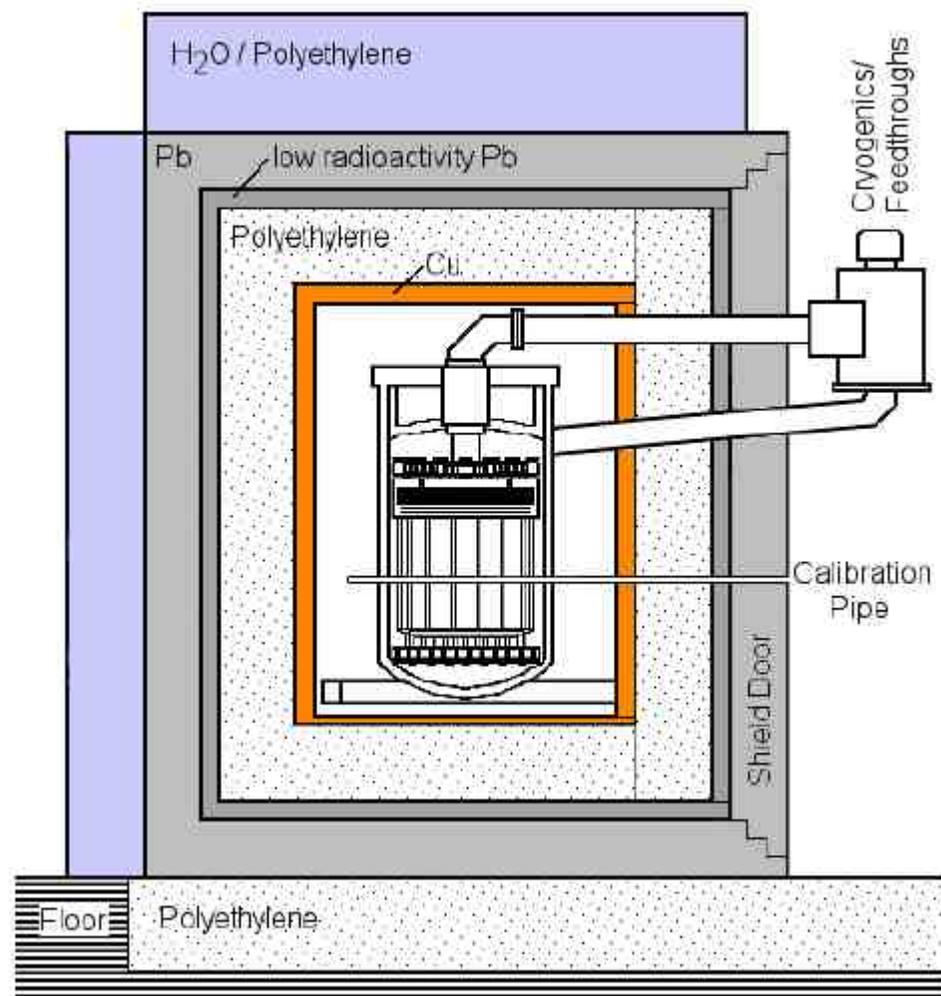
USCITA EMERGENZA  
EMERGENCY EXIT

USCITA EMERGENZA  
EMERGENCY EXIT









# Warum ausgerechnet Xenon?

*Elemente*

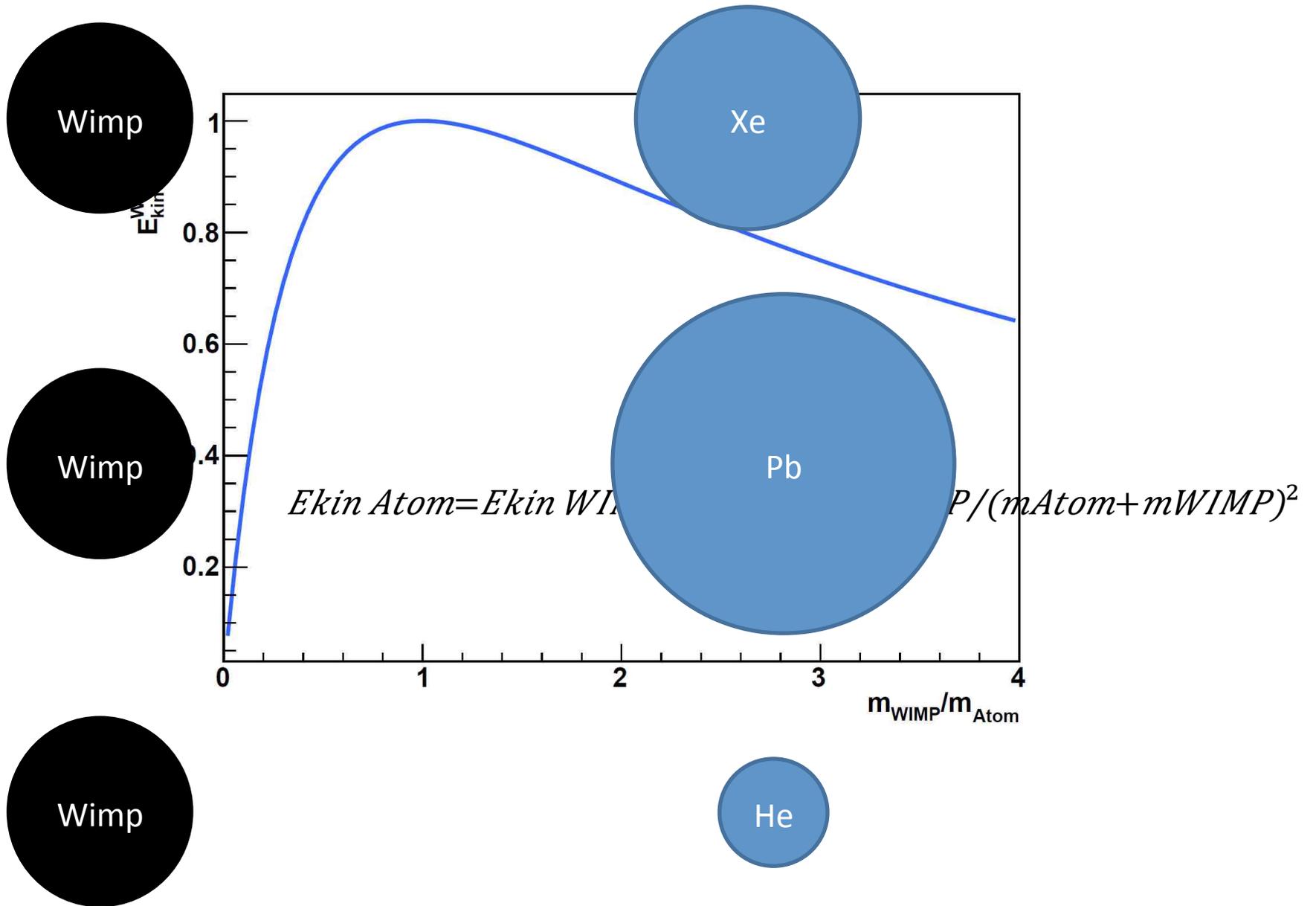
															18
										13	14	15	16	17	2
										B	C	N	O	F	He
										Bohr	Kohlenstoff	Stickstoff	Sauerstoff	Fluor	Helium
										10.81	12.01	14.01	16.00	18.998	4.00
										Al	Si	P	S	Cl	Ar
										Aluminium	Silicium	Phosphor	Schwefel	Chlor	Argon
										26.98	28.09	30.97	32.07	35.45	39.95
28	29	30	31	32	33	34	35	36							
Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr							
Nickel	Kupfer	Zink	Gallium	Germanium	Arsen	Selen	Brom	Krypton							
58.70	63.55	65.38	69.72	72.64	74.92	78.96	79.90	83.80							
46	47	48	49	50	51	52	53	54							
Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe							
Palladium	Silber	Cadmium	Indium	Zinn	Antimon	Tellur	Jod	Xenon							
106.42	107.87	112.41	114.82	118.71	121.76	127.60	126.90	131.29							
78	79	80	81	82	83	84	85	86							
Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn							
Platin	Gold	Quecksilber	Thallium	Blei	Bismut	Polonium	Astat	Radon							
195.08	196.97	200.59	204.38	207.2	208.98	(209)	(210)	(222)							
110	111														
Ds	Rg														
Darmstadtium	Röntgenium														
(285)	(288)														

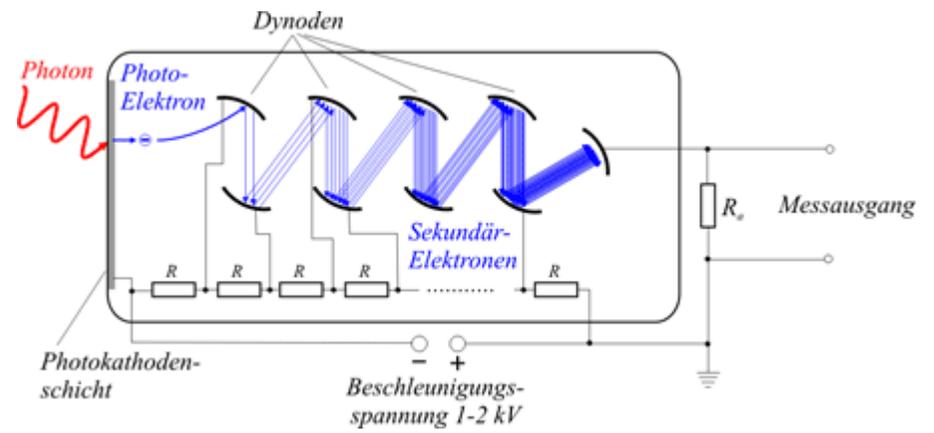
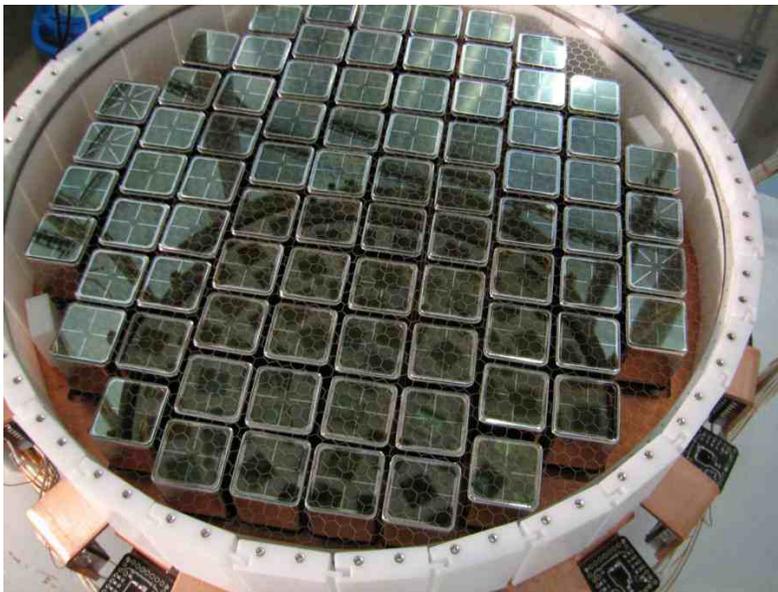
© Peter Wich - Experimentalchemie.de - Chemie erleben!

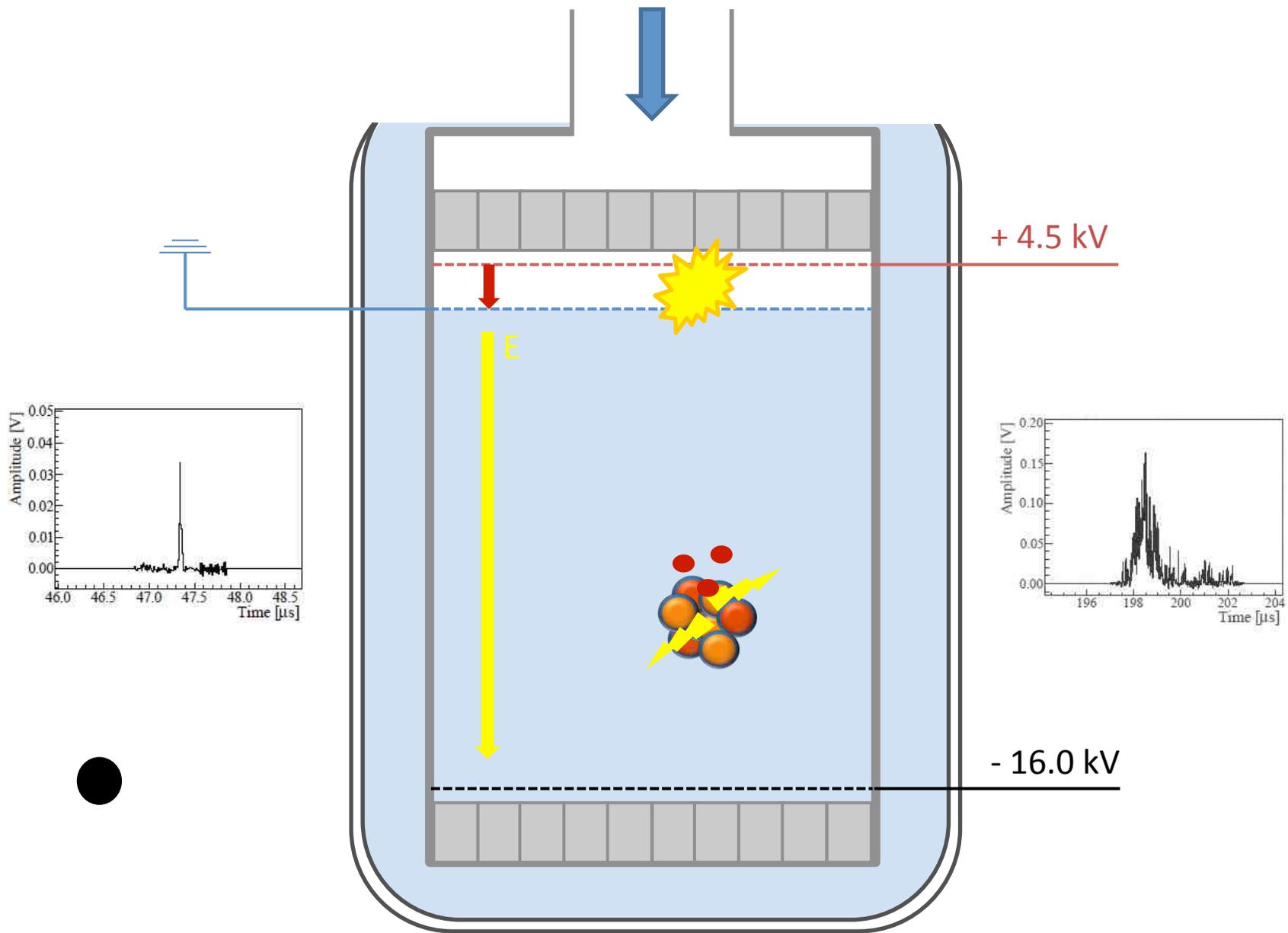
64	65	66	67	68	69	70	71
Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Gadolinium	Terbium	Dysprosium	Holmium	Erbium	Thulium	Ytterbium	Lutetium
157.25	158.93	162.50	164.93	167.26	168.93	173.05	174.97
96	97	98	99	100	101	102	103
Cm	Bk	Cf	Es	Fm	Md	No	Lr
Curium	Berkelium	Californium	Einsteinium	Fermium	Mendelevium	Nobelium	Lavrencium
(247)	(247)	(251)	(252)	(257)	(258)	(259)	(262)

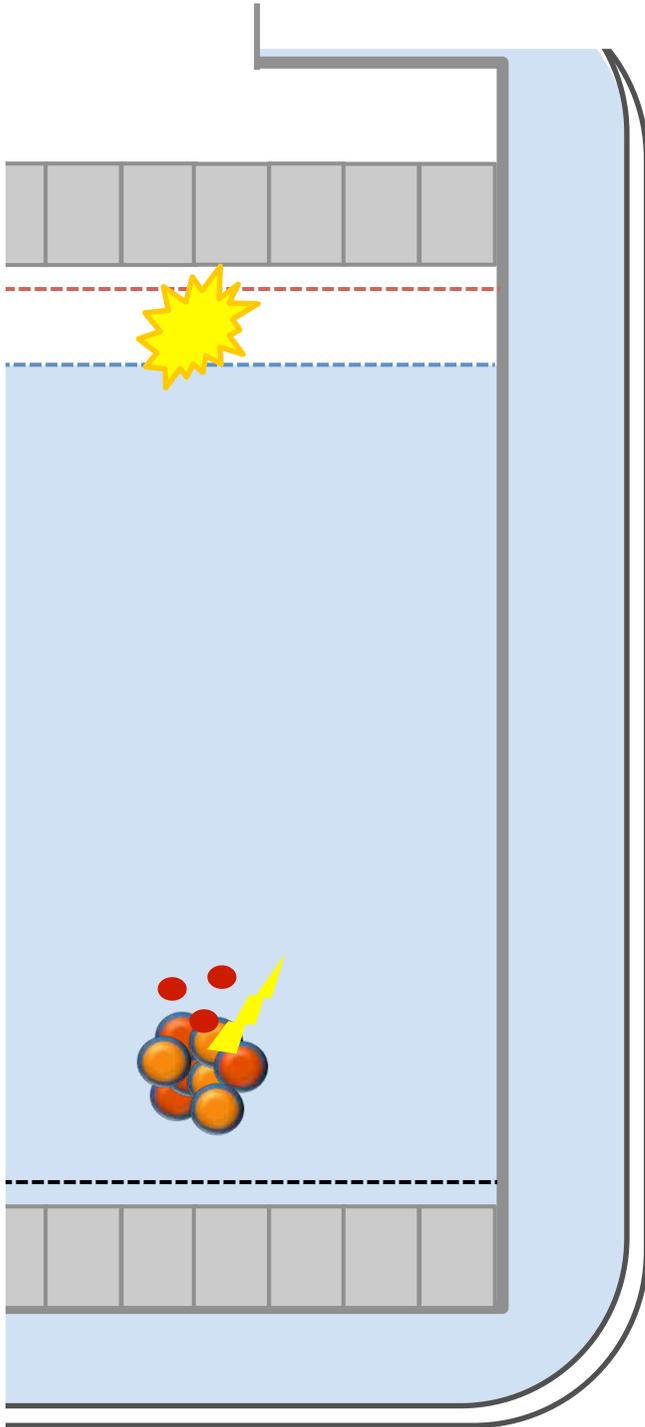
- Edelgas (inert, nicht reaktiv, Elektronen driften)
- Guter Scintillator (Lichterzeuger)
- Hohe Dichte (Selbstabschirmung vor Hintergrundstrahlung, große Targetmasse)
- Trefferwahrscheinlichkeit für WIMP-Stöße proportional zu  $A^2$  (Massenzahl)

# Warum ausgerechnet Xenon?



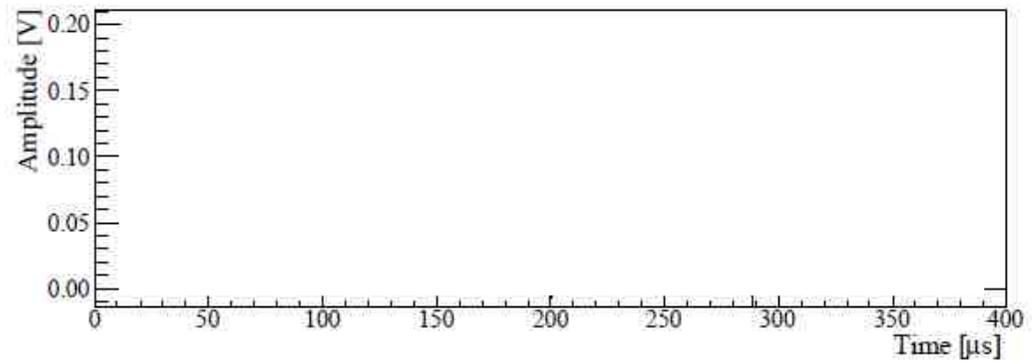






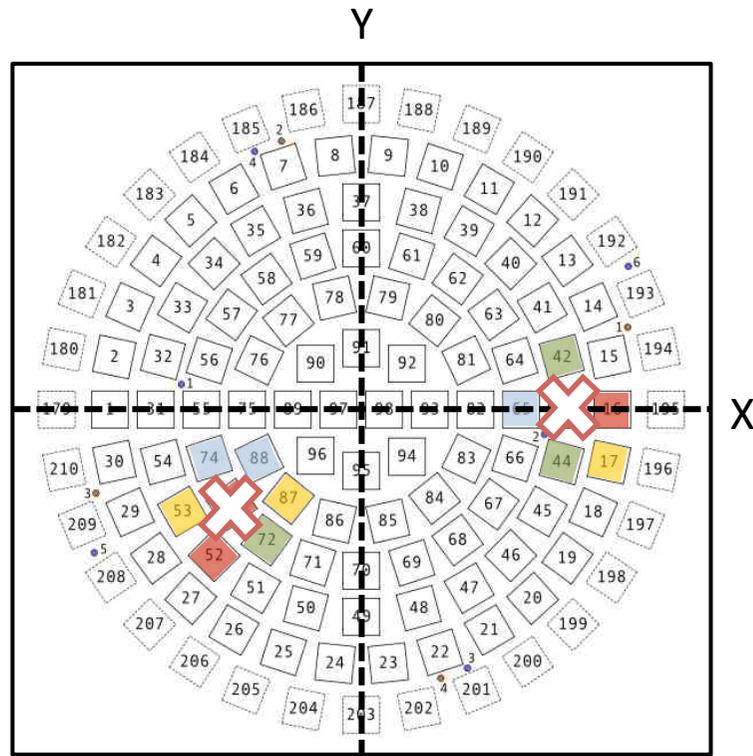
● Rec

Zeitlupe ( $1s \approx 20 \mu s$ )

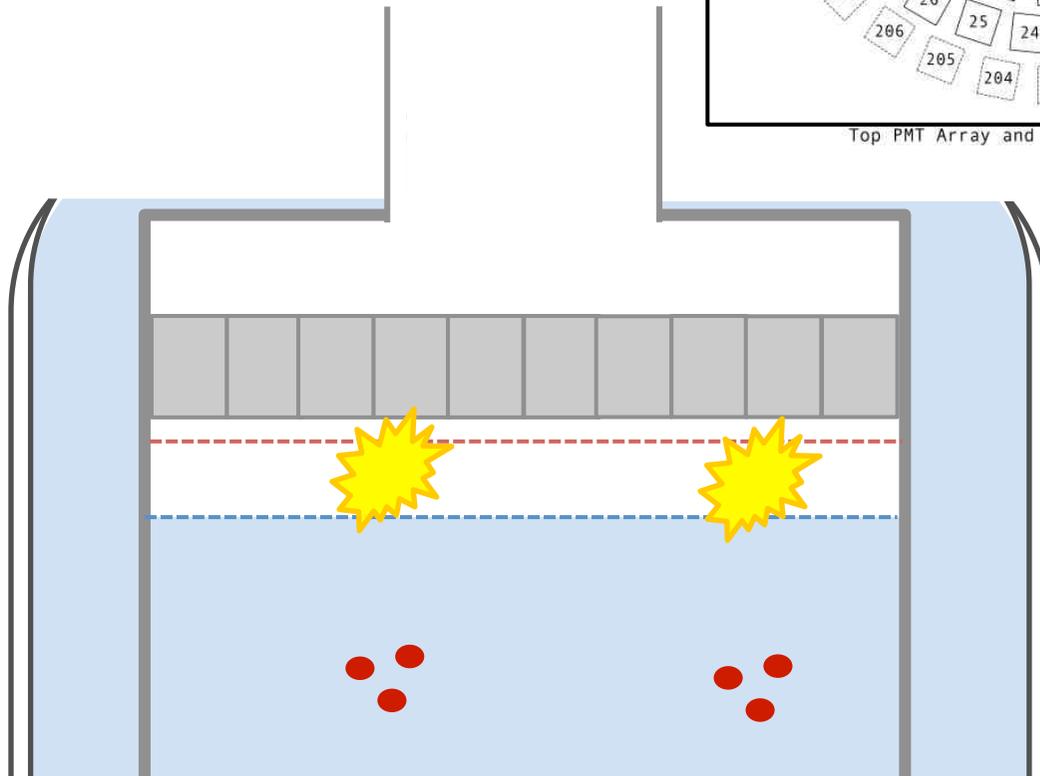


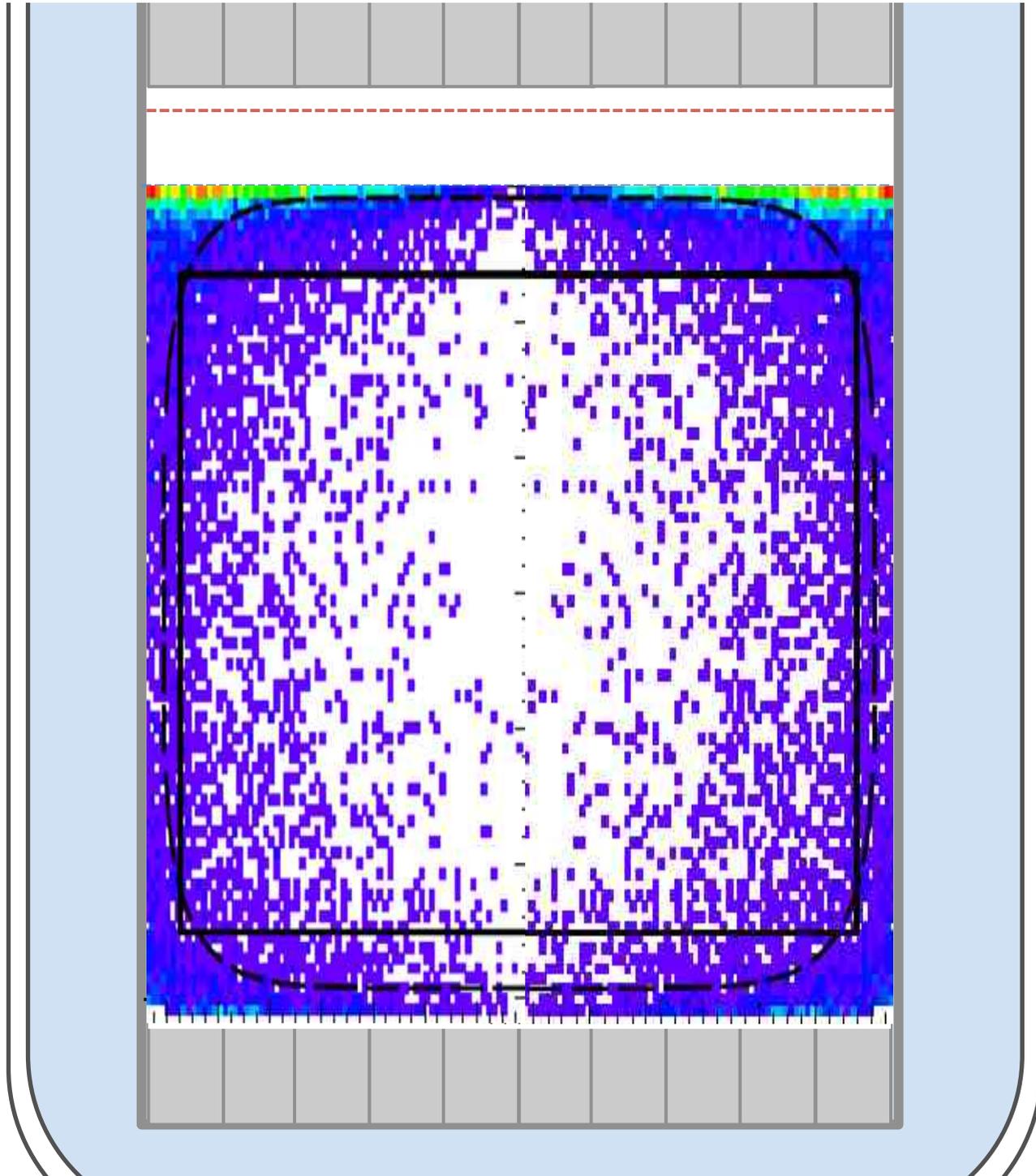
$$z(dt) = v_{Drift} \cdot dt$$

$$v_{Drift} \approx 1,74 \text{ mm}/\mu s$$

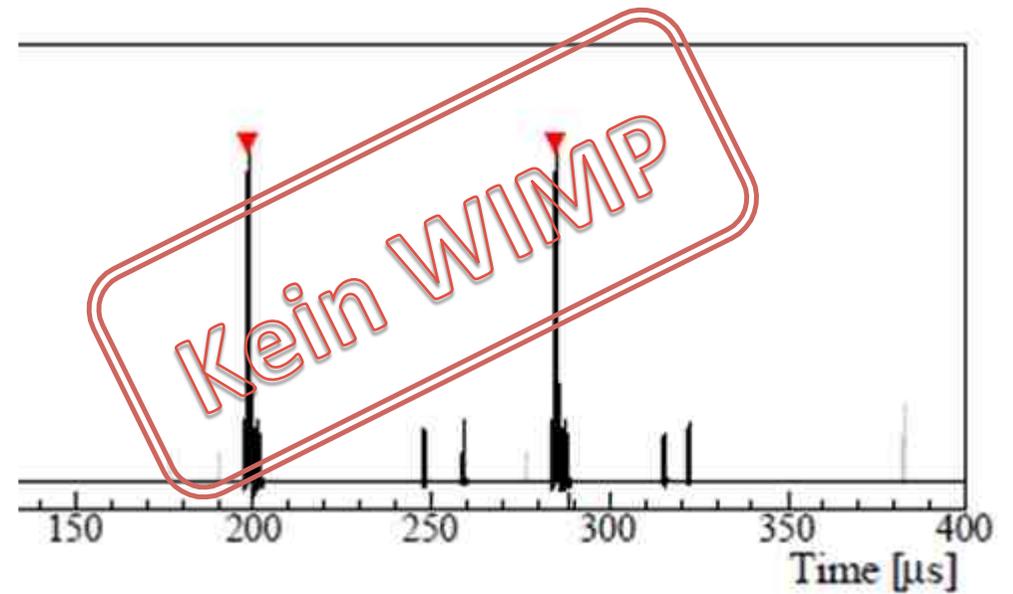
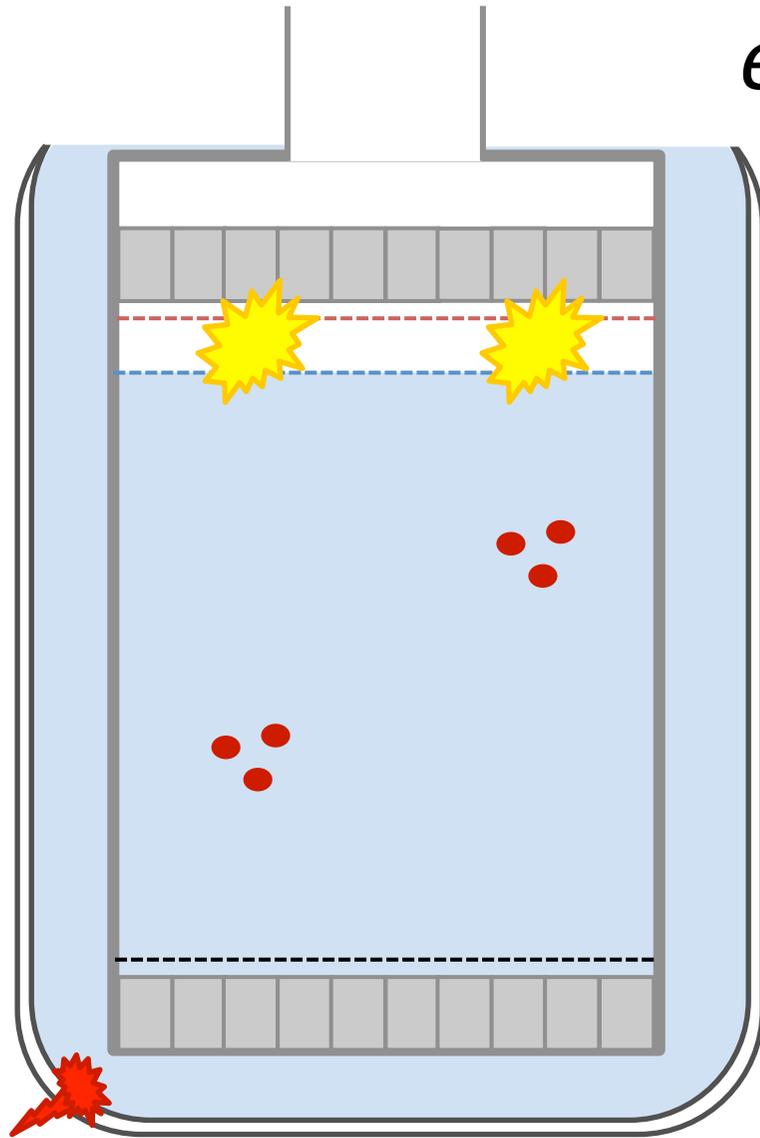


Top PMT Array and Top Shield PMT Array

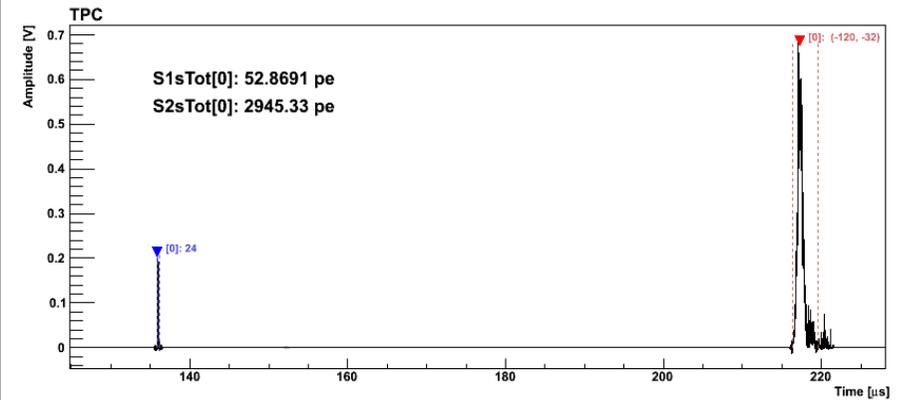




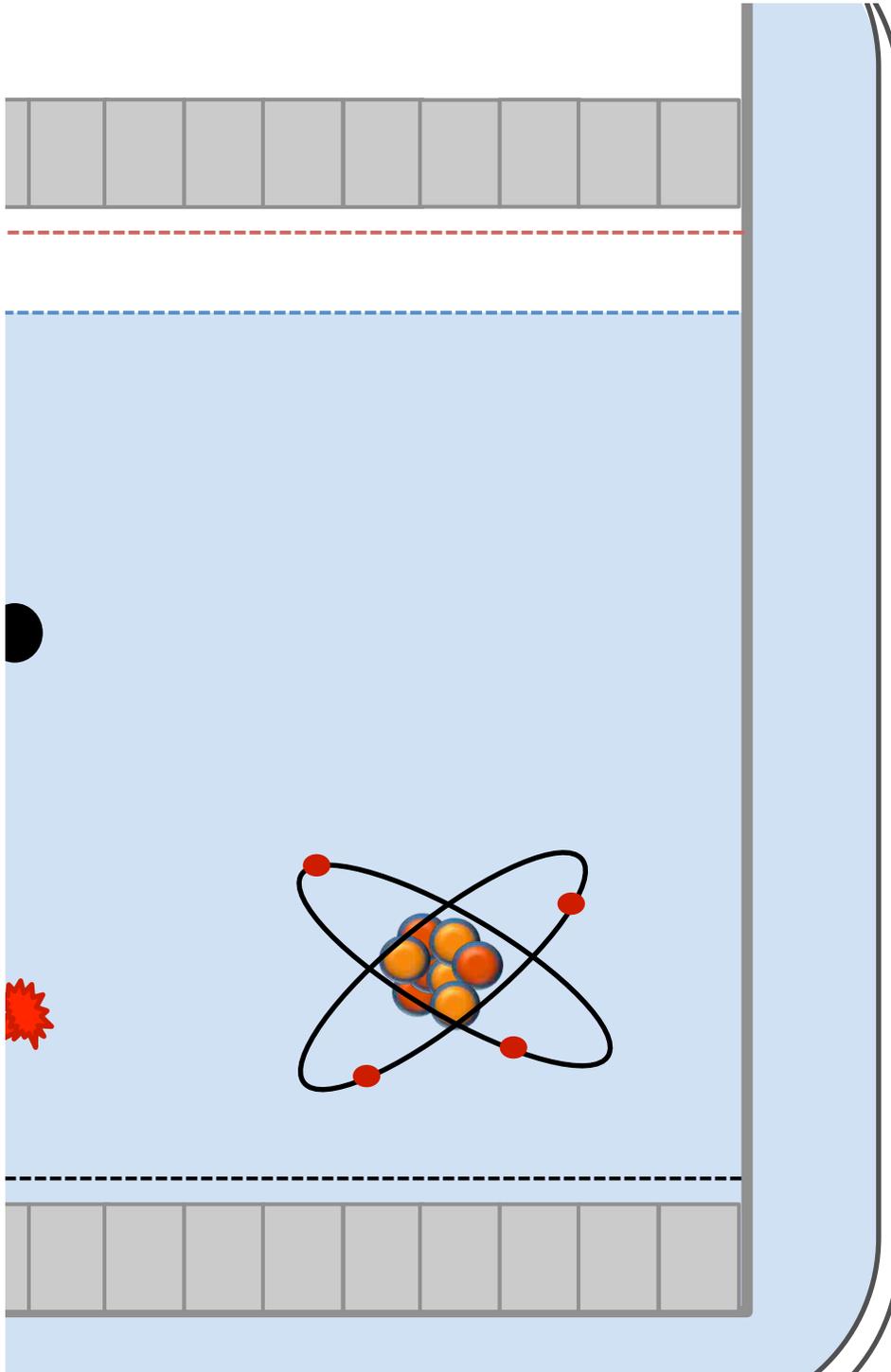
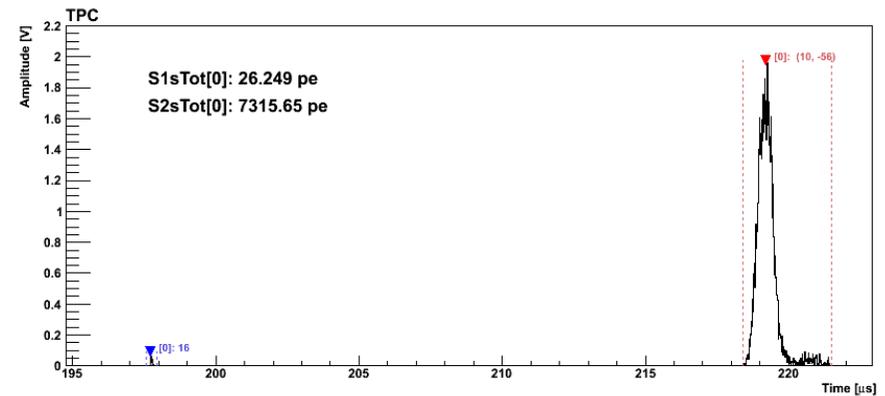
*Ein WIMP streut nur einmal (wenn überhaupt)*

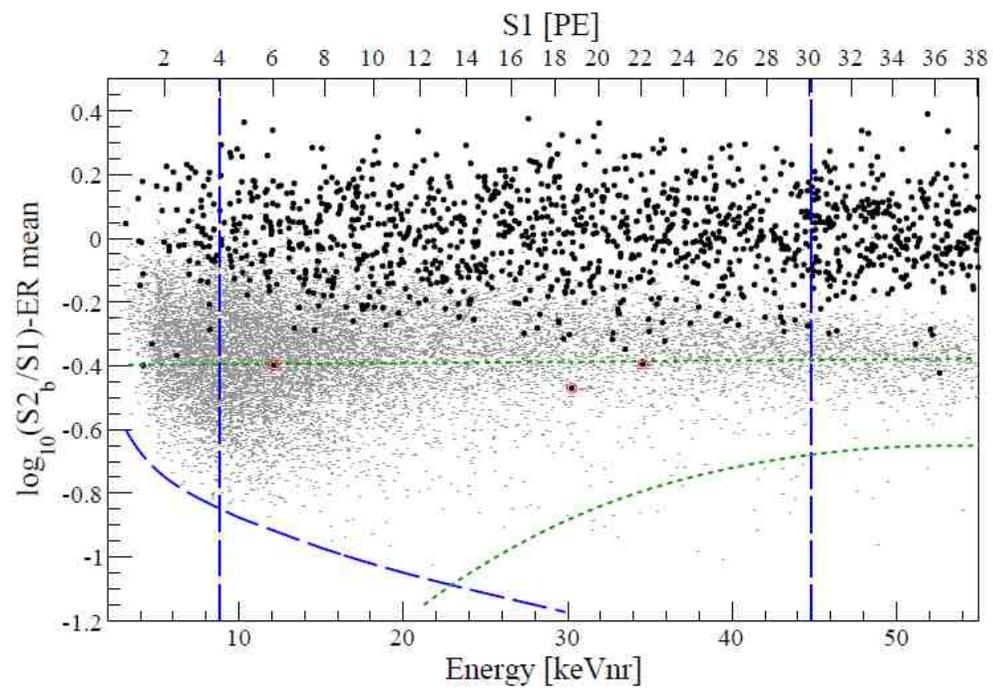


# Ein WIMP streut am Atomkern



# $\alpha$ -, $\beta$ -, $\gamma$ -Strahlung an der Atomhülle

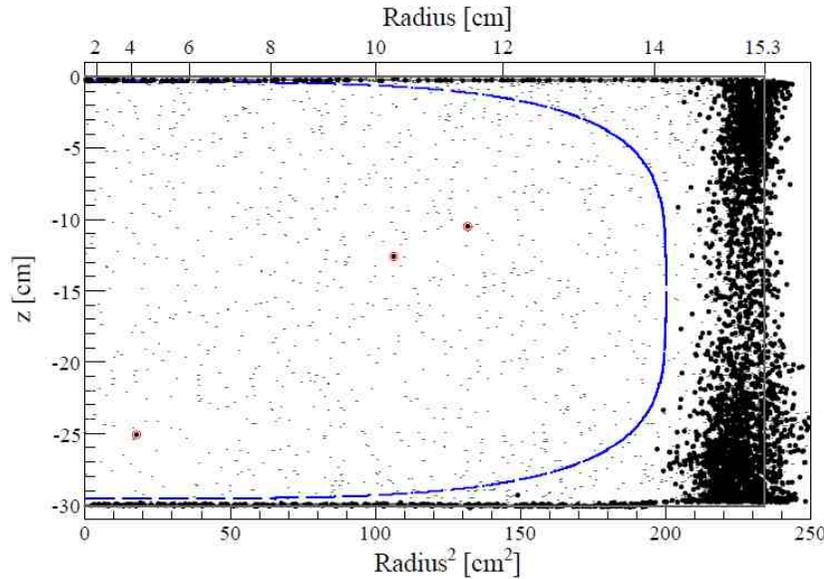




*Untergrundstrahlung*

*Eichung mittels Neutronen*

# Nach Auswertung von 100 Tagen Messdauer



3 *Prüfungskandidaten*  
Noch keine  
Entdeckung

bei durchschnittlicher  
Erwartung von 2  
Untergrundereignissen

