THE NUCLEAR PHYSIC GROUP IN NOVI SAD

Background : nuclear structure studies by γ,β spectroscopy ;

γ-γ,γ-β coincidences ,

γ-γ , γ-β directional angular correlations, nuclear orientations.

Present: rare nuclear processes studied by low level γ spectroscopy

Some relevant results:

- - Detection Limits of the NaI(Tl) Shielded HPGe Spectrometer; *NIM A 421(1999) 266*
- - Population of the 283 keV Level of 137Ba by β Decay of 137 Cs; *Phys. Rev. C 54 (1996) 3270*
- - Depopulation of 180mTa by Bremstrahlung ; *Phys.Rev. C 59(1999) 2272*
- - Deexcitation of 180mTa by 60 Co Gamma Rays; *Astrophys.J. 522(1999) 419*
- - New Results on the Double β Decay of Iron; *Phys. Rev. C 58 (1998) 2566*

Some relevant results:

- ***- Electron-Positron Conversion Decay of 64Zn; Appl. Radiat.Isot. 46 (1995) 455***
- **Double β Decay of 50Cr;** ***Phys.Rev. C 67 (2003) 65801***
- **- First Results from KamLAND: Evidence for Reactor Anti-Neutrino Disappearance;** ***PRL (Dec. 2002)***
- **- Background Studies for CRESST**

EURONS, 13th and 14th of May,2005 Bucharest

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THE COSMIC RAY MULTIPURPOSE EXPERIMENT (CRYME) IN NOVI SAD

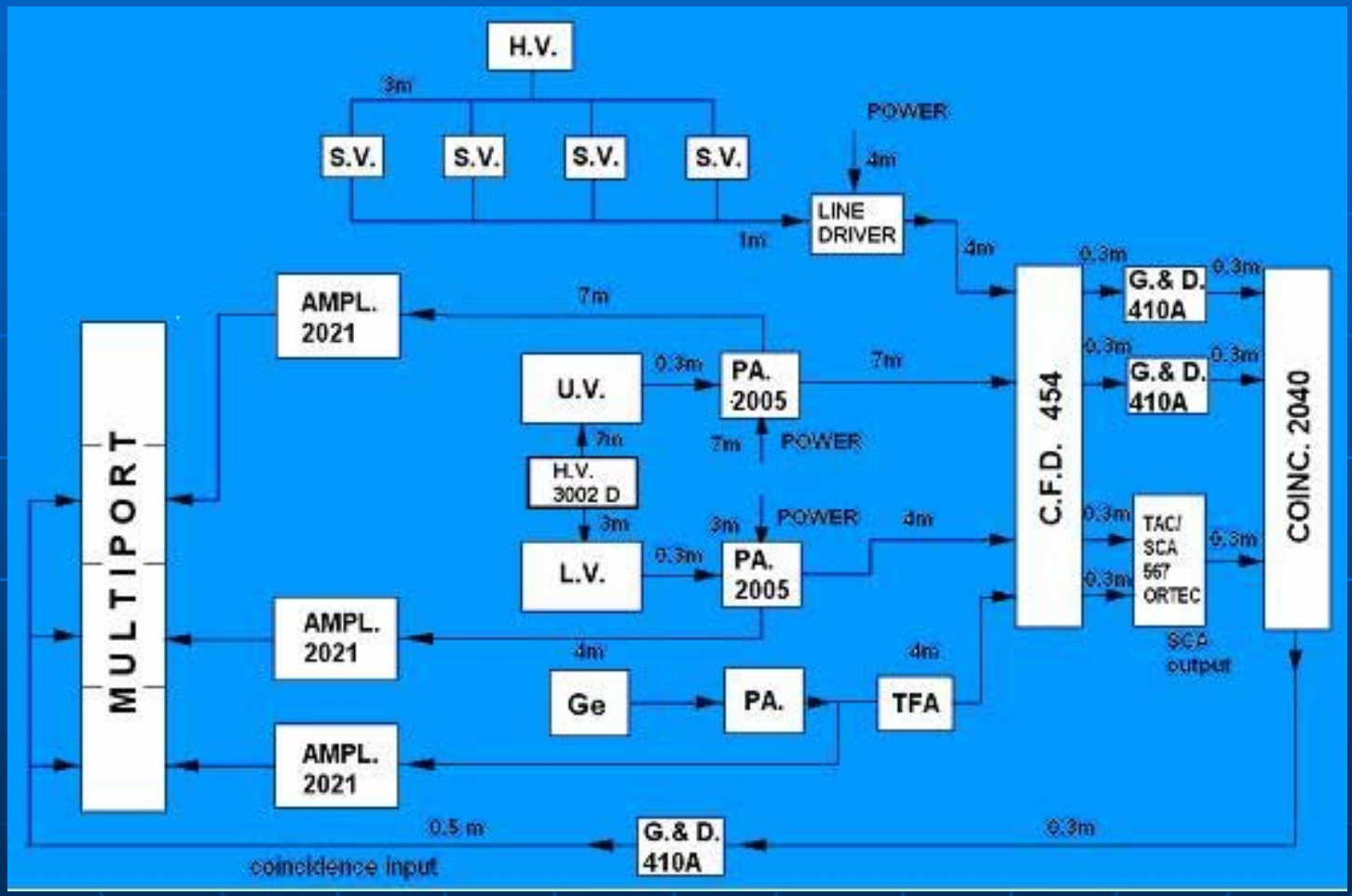
Components:

- -extended range 10 keV-3 MeV low background HPGe spectrometer, nominal efficiency 34%
- -12 cm thick cylindrical lead shield, lined with 3.5 mm Sn + 0.5 mm Cu (NB=0.9 c/s in 20-1800 keV)
- -six 5cm×50 cm×50 cm plastic veto shields

UPPER VETO

THE LEAD SHIELD AND THE FIVE VETO DETECTORS

THE ELECTRONIC SCHEME



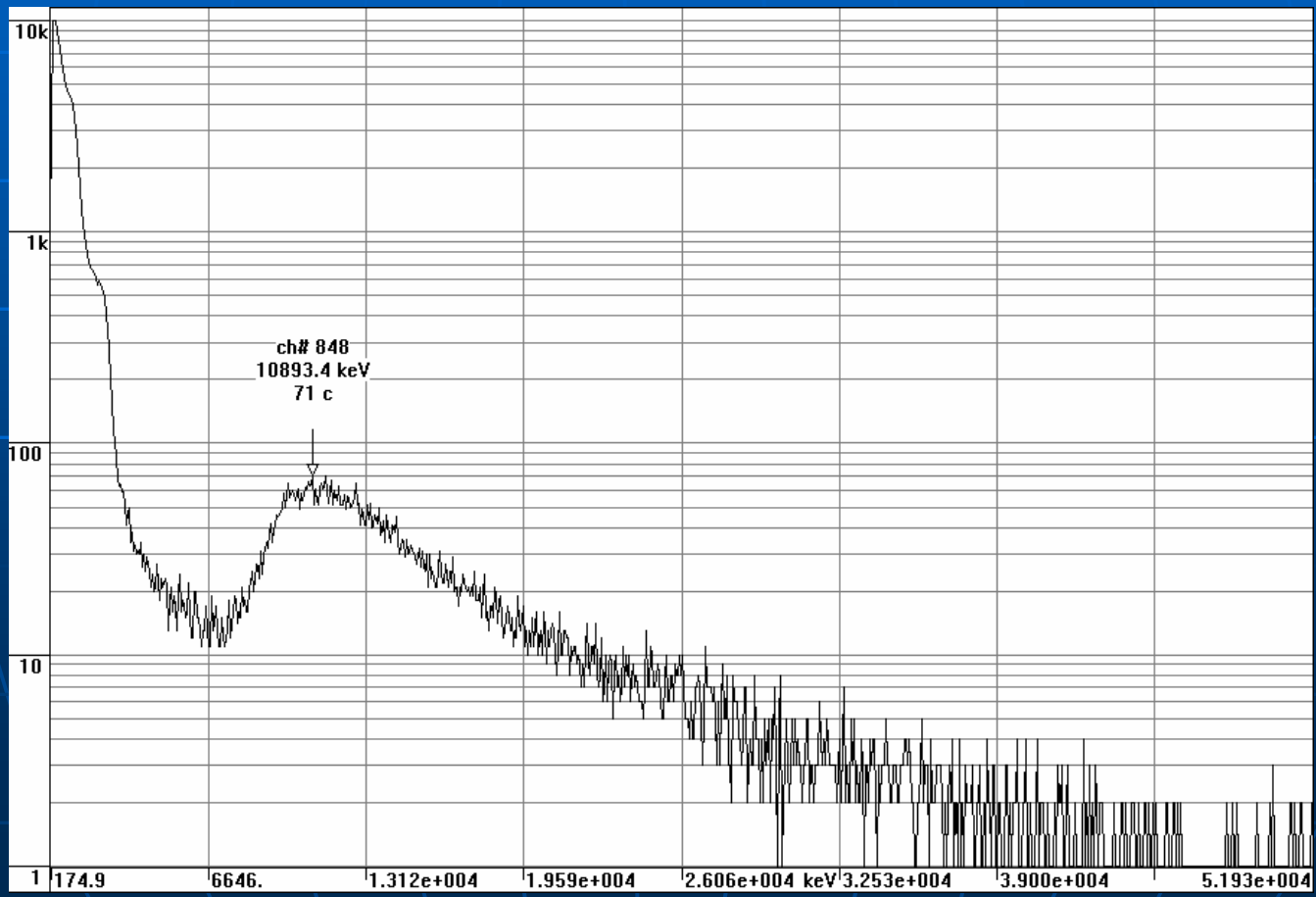
H.V.- high voltage G.&D.-gate and delay L.V.-lower veto
S.V.-side veto AMPL.-amplifier
U.V.-upper veto PA.-preamplifier

MAIN FEATURES

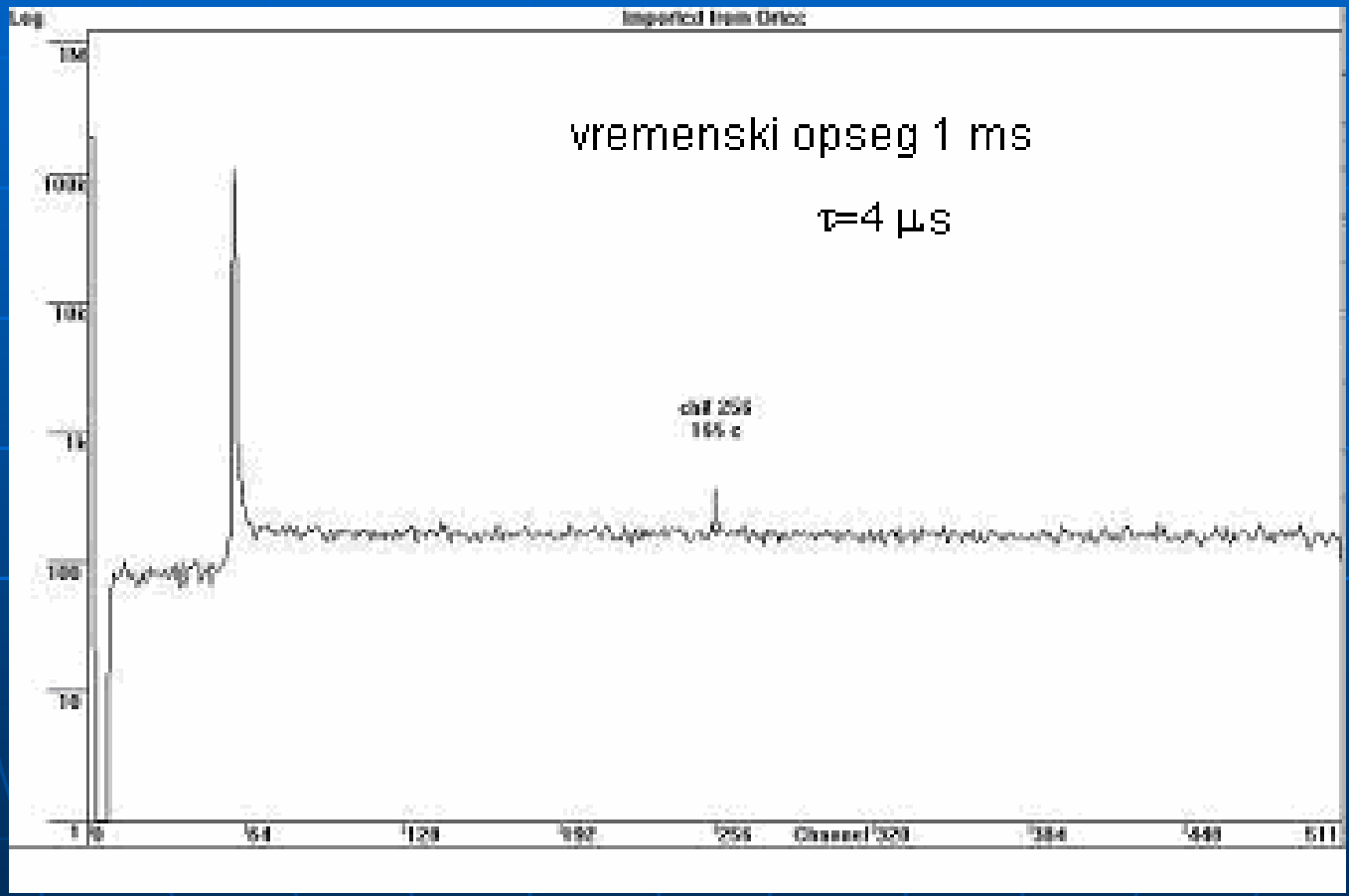
- - 4π actively shielded spectrometer in coinc/anticoinc
- -Spectroscopic information from the shields
- -S. V. –anticoincidence active shield (for plastic detectors)
- -U. V., L. V., HPGe coincidence, direction and energy dependent coincidence detection of cosmic ray induced events in the sample or HPGe.
- - cosmic rays induced background studies, material radiopurity tests

FIRST RESULTS IN ANTI-COINCIDENCE (VETO) MODE

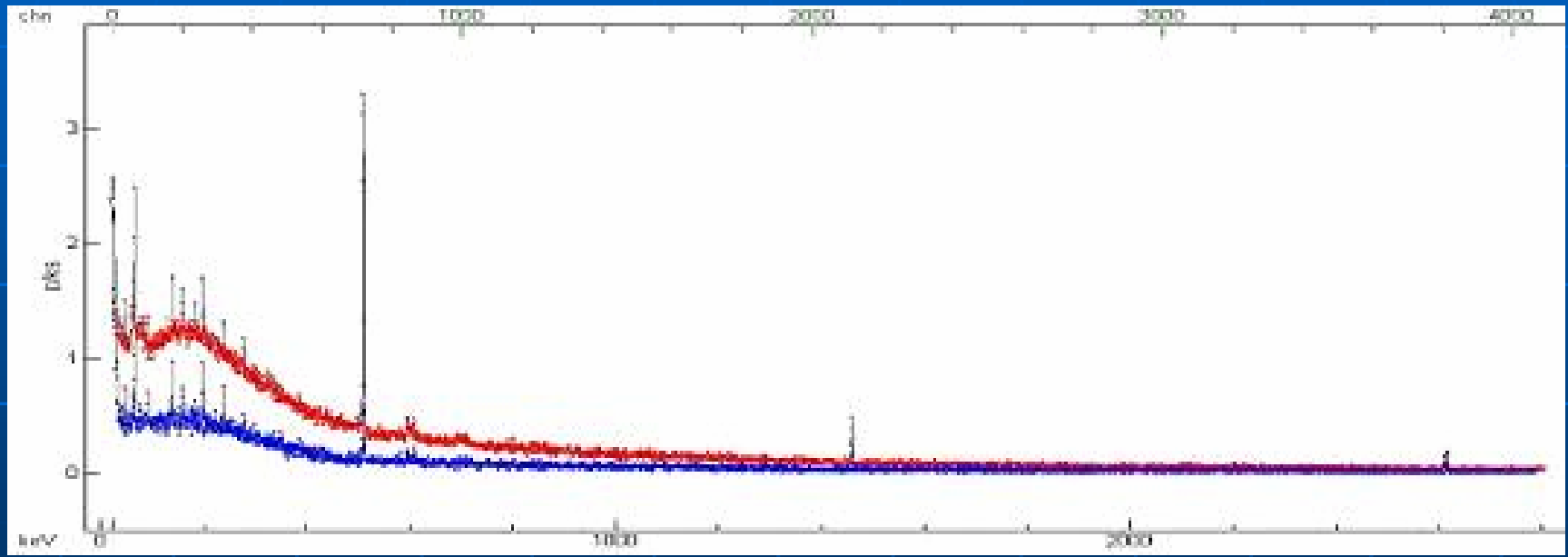
the background spectrum of a horizontal SCONICS detector



The time spectrum (range 1 ms)



The direct (upper) and vetoed (lower) germanium spectrum



The reduction of main background lines

E_γ [keV]	radionuclide	I_1[c/ks] direct	I_2[c/ks] vetoed
46.24	^{210}Pb	0.84(21)	0.69(20)
66.67	^{230}Th	2.94(23)	2.8(4)
92.6	^{214}Pb	0.61(20)	0.51(20)
198.82	^{228}Ac	1.70(6)	0.95(7)
238.7	^{224}Ra	0.63(27)	0.81(27)
278.51	^{228}Ac	0.26(25)	0.73(23)
511	ANN	12.7(4)	2.31(27)
608.76	^{214}Bi	0.42(11)	0.35(10)
802.57	^{134}Cs	0.28(9)	0.11(8)
1460.79	^{40}K	1.08(11)	0.87(10)
2614.46	^{208}Tl	0.60(8)	0.44(8)

The reduction of the continuum

E [keV]	Number of channels	I[c/ks] direct	I_V [c/ks] vetoed	$R=I/I_V$
50	10	12.21	4.43	2.75
100	10	12.13	4.60	2.64
200	10	12.96	4.49	2.89
300	10	9.15	3.14	2.91
400	10	5.99	1.95	3.07
500	10	4.55	1.28	3.55
1000	10	1.71	0.54	3.17
1500	10	0.91	0.17	5.35
2000	10	0.56	0.12	4.67
50-2800	4096	959	316	3.03