

Initial Tests with LNMRI/IRD Digital Coincidence System

BIPM Workshop

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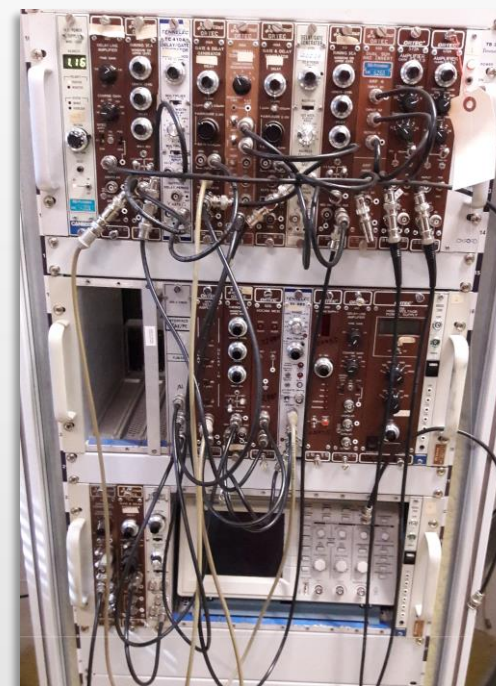
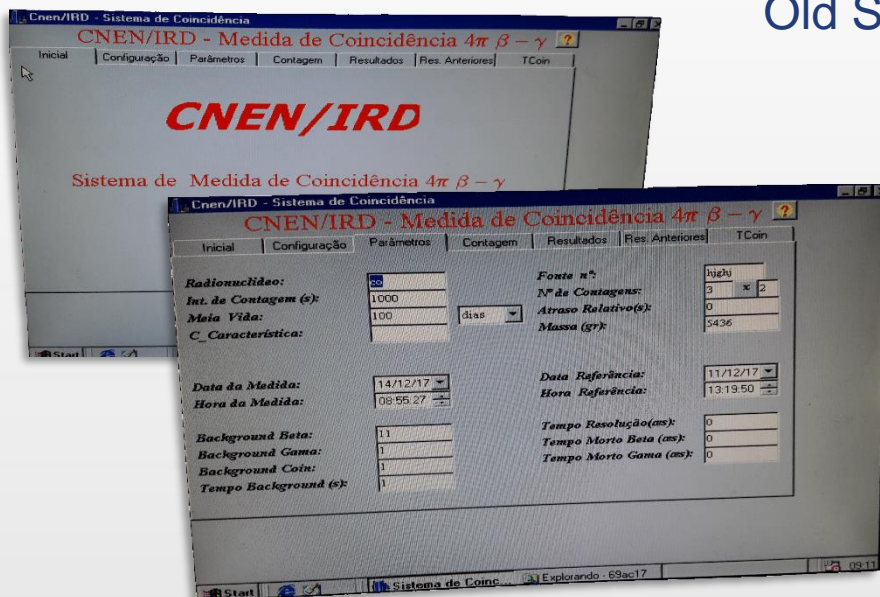
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June / 2022

Coincidence System 4π β - γ

Old System



Old System:

- . Operate until 2018
- . Software developed in C language (“Cox-Isham”)
- . Interface: Card Wire-up home made slot ISA
- . Problems: Data acquisition (Computer – Very old)

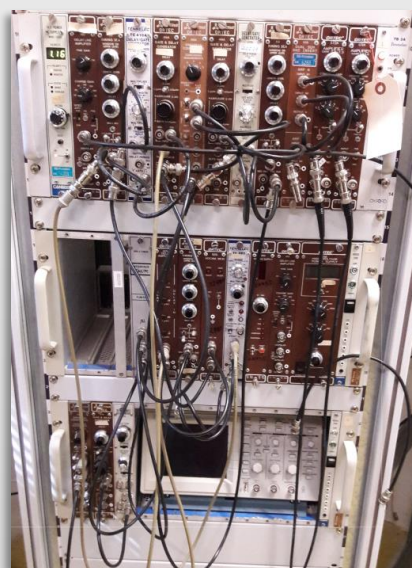
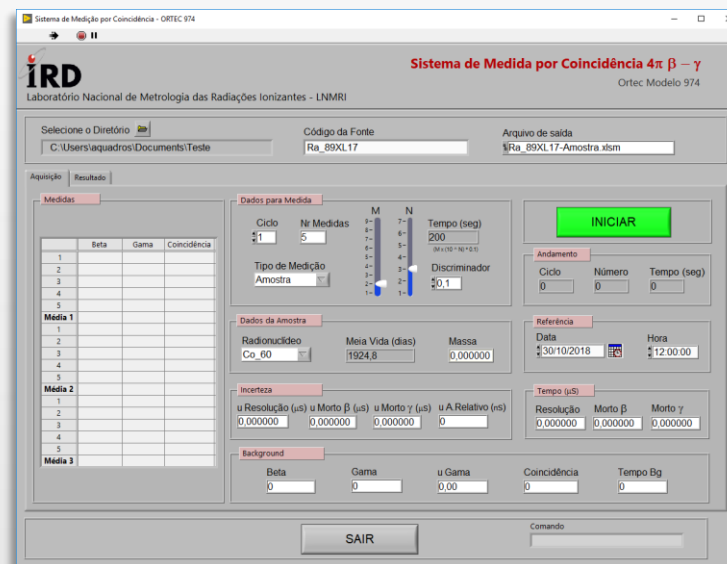
Coincidence System 4π β - γ

Current System

Contador
Ortec 974



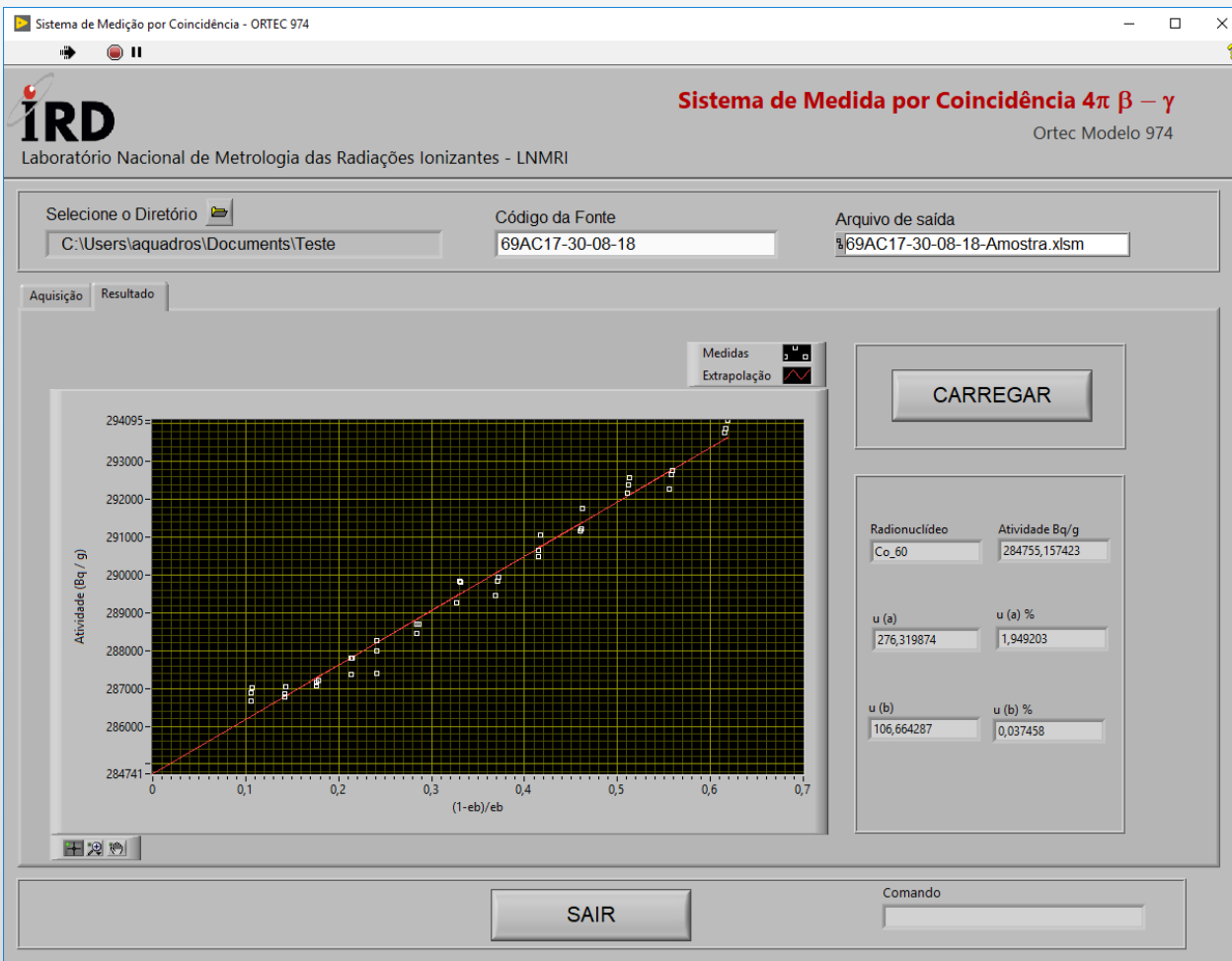
PCI-e
GPIB NI



- . Calculus Excel
- . Interface Comercial (PCI- GPIB NI) and Ortec 974
- . Algoritmus: Cox-Isham
- . Control LabView 2017

Coincidence System 4π β - γ

Current System

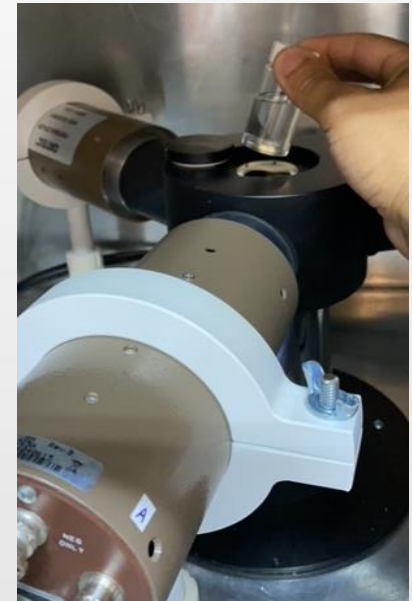
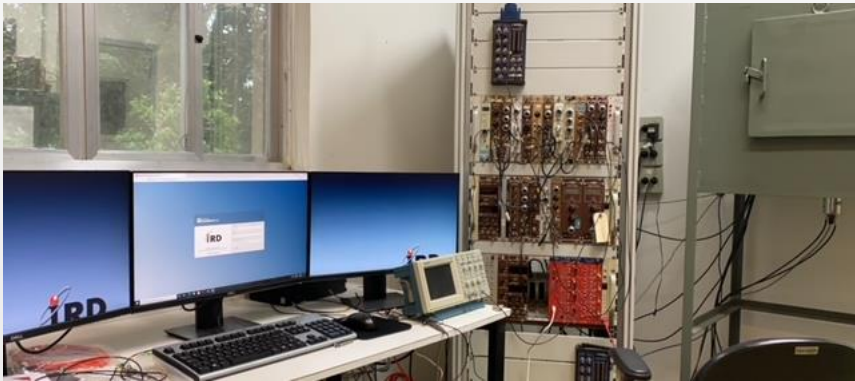


System Features:

- . Activity Determination - Semi automatic
- . Extrapolation Curve
- . Two sources day

Digital Coincidence System 4π β - γ

Digital



System Features

- . Automatic discrimination process
- . Data acquisition – very fast
- . Could be made improvement in software
- . Home made in LabView 2017 – LNMRI/IRD
- . Card NI PCIe-6374 – 3.5 MSample/s
- . Next step CAEN N6751C – 2 GSAMPLE/s

Digital Coincidence System 4π β - γ

Digital



IRD
Laboratório Nacional de Metrologia das Radiações Ionizantes -

Sistema de Medida por Coincência 4π β - γ
DIGITAL

Medição | Resultado | Resultado Final

Canal Gama

Limiar (Ruído): 0,10
Pulsos (hz): 0

Dados da Amostra

Conjunto de Fontes: Co60 Validação (UG) + -

Código Fonte: 30AC18 + -

Data da Referência: 09/07/2018 12:00:00 Massa: 0,023988

Radionuclídeo: Co_60 Meia Vida(d): 1924,80 Inc +/- (d): 0,292194

Tempo (us)

Morto β : 25,13804 Morto γ : 4,063301 Resolução: 0,989

Background

Gama	u Bg	Δ Tempo (s)
269	16	100

Beta	Coincência
3182	0
2577	0
2218	0
1940	0
1717	0

Canal Beta

Limiar (Ruído): 0,10
Pulsos (hz): 0

Aquisição

Tipo de Medição: Amostra Cintilador: UG Tempo (s): 500 Log:

Data: 13/01/2022 12:35:00 Qtd Medidas: 3 / 3

ROI Beta

Tensão	Canal
0,1	164
0,125	205
0,15	246
0,175	287
0,2	328
0,225	369

ROI Gama

Tensão	Canal
Min	3,55 5816
Max	4,93 8077

Tempo Vivo γ : 0
Tempo Vivo β : 0

Automático

Resultado

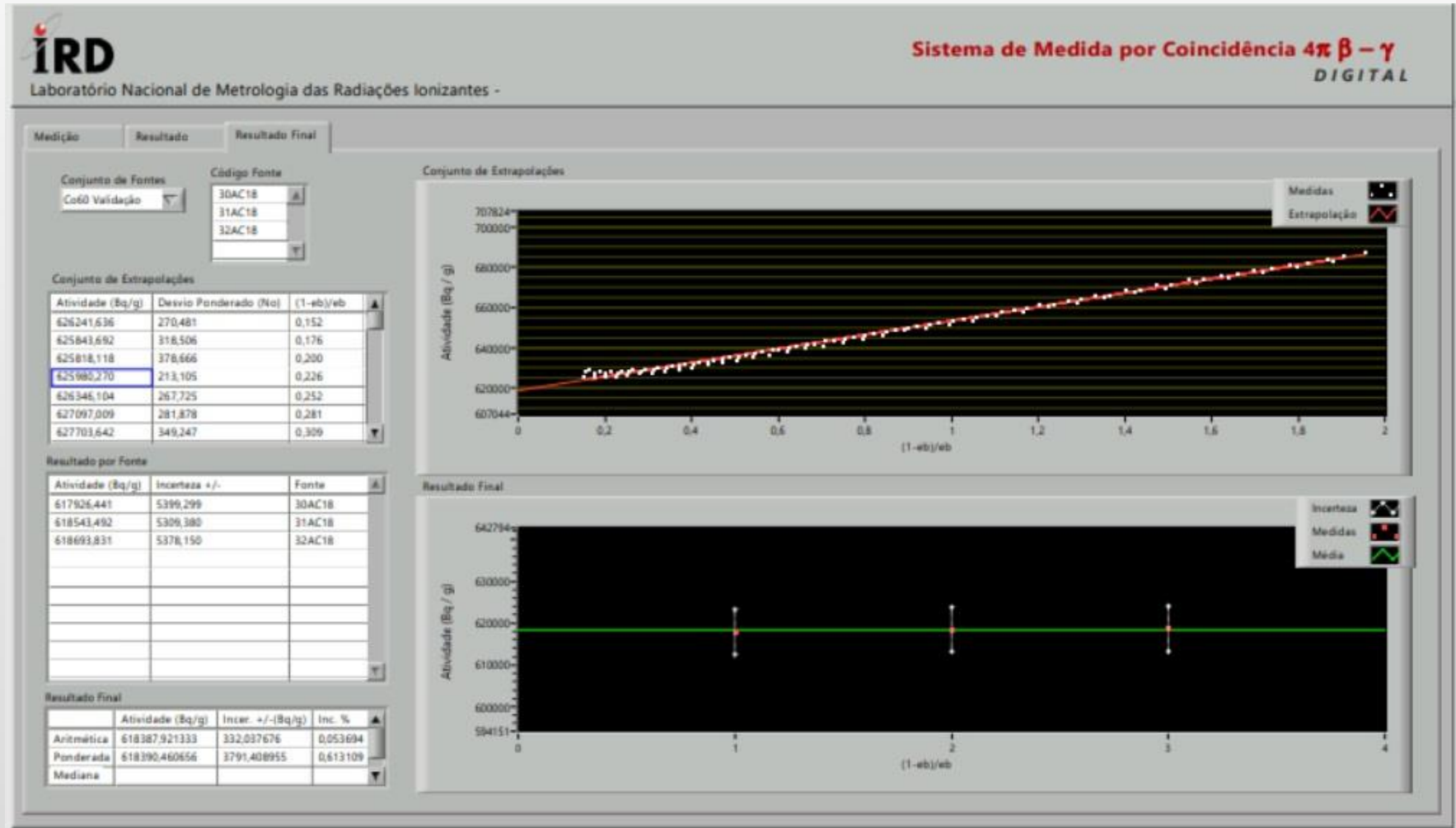
Atividade (Bq/g)	Incerteza +/-	ua (%)	ub (%)	U(%)	2 * U(%)
0,000	0,000	0,00	0,00	0,00	0,00

Botões: INICIAR, CARREGAR, CALCULAR, SAIR

Status: Concluído !!!

Digital Coincidence System 4π β - γ

Digital



Digital Coincidence System 4 π β - γ

	Anticoincidence* System A (kBq/g)	Coincidence System A (kBq/g)	Digital Coincidence System A (k Bq/g)
^{60}Co	618.7 (0.30 %) $\Delta = 0.0$	620.8 (0.44 %) $\Delta = 0.34 \%$	618.4 (0.22 %) $\Delta = 0.06 \%$
^{152}Eu	624.5 (0.54 %) $\Delta = 0.0$	621.8 (0.60 %) $\Delta = 0.43 \%$	622.4 (0.50 %) $\Delta = 0.34 \%$
* Cooperation with LNHB			

Digital Coincidence System

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Thank you !!!