Oscillations in s-curves

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Summary of characterisations in Bergen and Uppsala

Module	R_BB	Bergen					Uppsala					Comments
		Input Noise	Gain	NoiseOcc	T	Gnd*	Input Noise	Gain	NoiseOcc	Gnd*	T	
#02		1100-1219	58.8-68.1	3.9e-8 - 6.8e-7	0¡C	2	1200-1302	63.2-67.1	5.8e-7 - 6.2e-6		0¡C	No oscillations.
#06	0.0	1277-1455	52.7-58.0	3.3e-6 - 1.5e-5	0¡C	1	1312-1478	53.1-58.3	3.9e-6 - 9.0e-5		0¡C	Strong oscillations.
		1347-1510	55.8-61.2	4.1e-6 - 1.3e-5	0¡C	2						Same osc as gnd 1.
		1288-1566	52.8-66.3	9.1e-6 - 5.8e-4	0¡C	3						Small oscillations, but high noise occupancy
		1485-1648	50.3-54.3	9.7e-6 - 2.5e-5	27¡C	1						Same oscillations as for 0¡C
#07	0.4	1254-1476	51.3-56.9	1.5e-6 - 1.2e-5	0¡C	1	1217-1426	51.4-57.0	--			Some oscillations
		1235-1461	54.2-60.4	1.8e-6 - 8.8e-6	0¡C	2						
		1328-1543	49.5-53.4	1.3e-6 - 4.5e-6	27¡C	2						
#08	0.8	1271-1433	49.4-57.3	8.1e-7 - 3.1e-6	0¡C	1	1306-1407	49.7-57.3	1.4e-6 - 5.2e-5		0¡C	Very small oscillations
		1328-1482	49.3-57.0	1.5e-6 - 4.4e-6	0¡C	2						Same osc as gnd 1.
		1342-1517	49.9-57.9	2.1e-5 - 4.4e-4	0¡C	3						No osc, high noise occ.
#09	0.8	1380-1512	52.4-56.5	3.3e-5 - 9.9e-4	0¡C	3						No osc, high noise occ.
		1390-1487	52.5-56.3	1.5e-6 - 7.1e-6	0¡C	2	1379-1486	53.1-57.1	--		0¡C	Strong oscillations.
		1546-1665	50.3-52.9	3.5e-6 - 3.1e-5	27¡C	2						Strong oscillations.
		--	--	3.4e-6 - 2.6e-5	27¡C	4						Strong oscillations.
#10	0.0	1426-1511	48.3-53.5	5.2e-6 - 1.8e-5	0¡C	1	1555-1661	46.7-52.3	--		20¡C	Small oscillations.
#11	0.9	1380-1480	51.3-54.5	8.9e-6 - 2.8e-4	0¡C	3	1440-1508	51.1-54.2	5.6e-6 - 2.2e-5	4	5¡C	No oscillations.
									5.3e-6 - 2.4e-5	2	5¡C	
#12	0.0	1248-1436	56.0-61.5	4.0e-7 - 1.1e-5	0¡C	2	1499-1666	54.5-58.7	--		27¡C	No oscillations.
#13	0.0	1367-1507	51.7-58.5	2.6e-6 - 2.0e-5	0¡C	2	1564-1751	47.3-56.0	--		27¡C	Medium oscillations
#15	0.9						1357-1534	52.0-56.7	9.5e-7 - 7.9e-5	4	0¡C	Medium oscillations
							--	--	1.3e-6 - 8.3e-4	2	0¡C	
#16	1.0						1359-1484	53.9-59.3	3.8e-6 - 7.1e-5	4	0¡C	Strong oscillations
							--	--	3.4e-6 - 3.3e-3	2	0¡C	

*Gnd

1 Floating module frame

2 Frame connected to AGND on patchcard

3 Frame connected to AGND on LV3 via separate cable.

4 Frame connected to AGND both through patchcard
and separate cable to LV3.

Characterisation results from Bergen and Uppsala at 0¡C
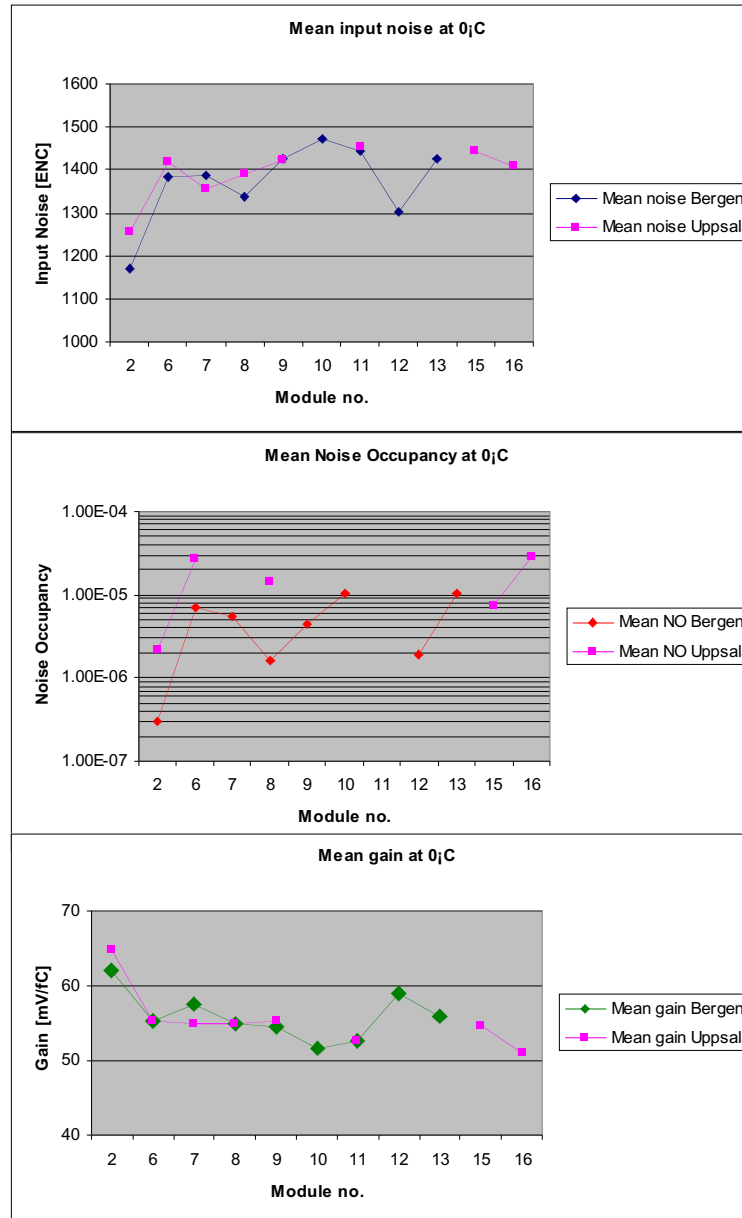
S-curves module 06 Bergen, 0° C, grounding 2

ATLAS SCT Noise Occupancy S-Curves - Sat Feb 15 18:29:13 2003 - BERGEN
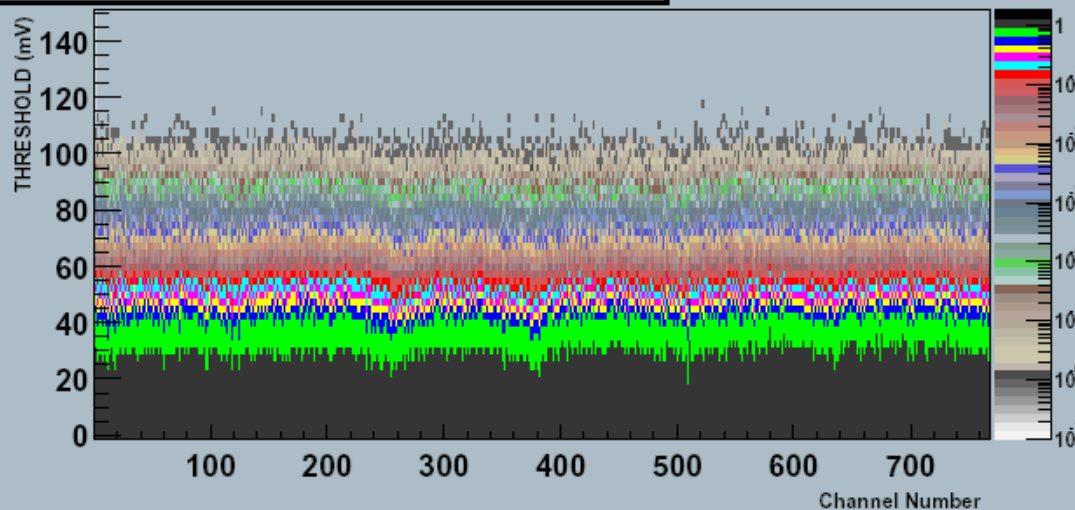Page 2 Run 674 Scan 53 Module 0 (20220380200006) - Type .
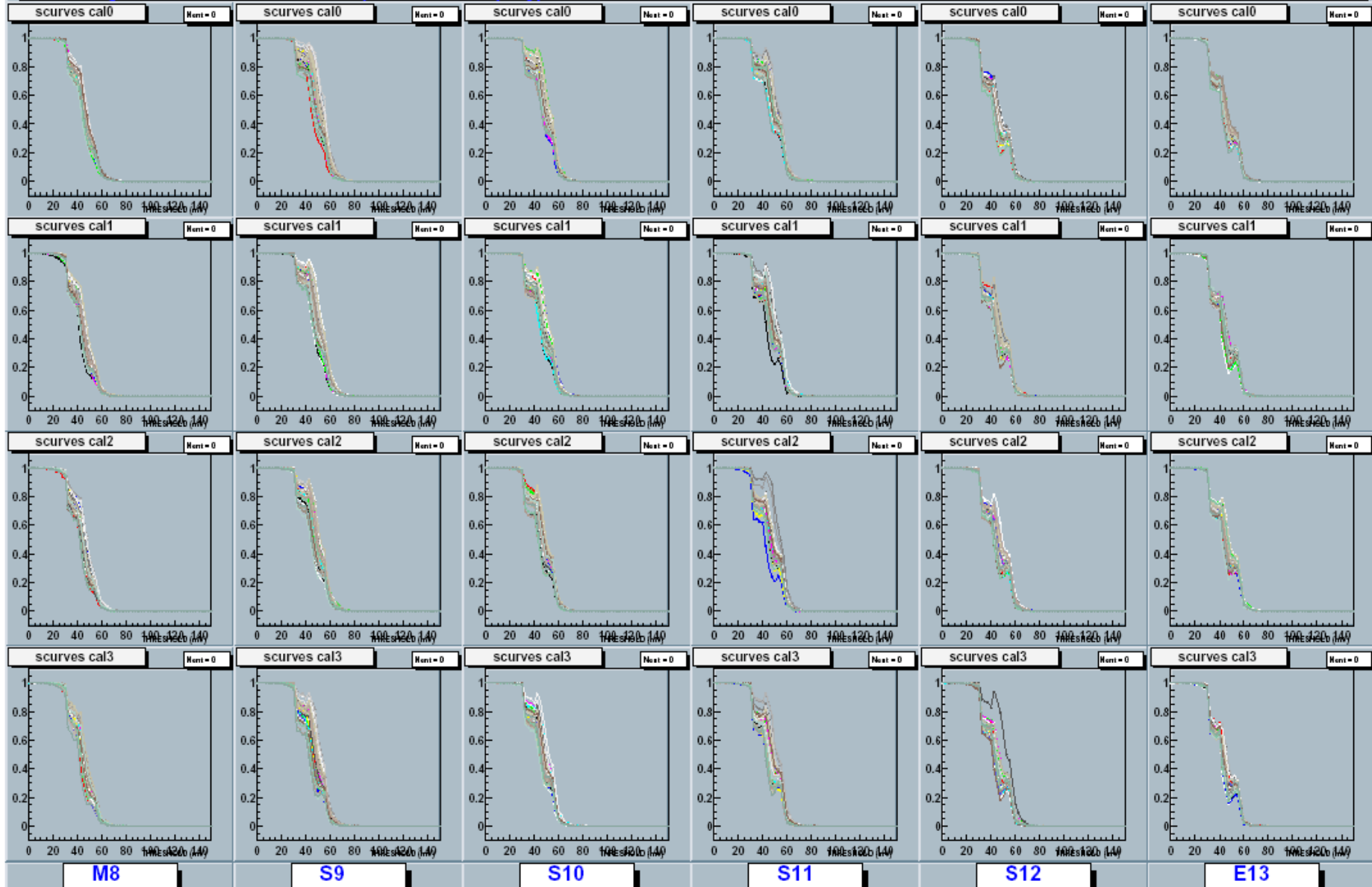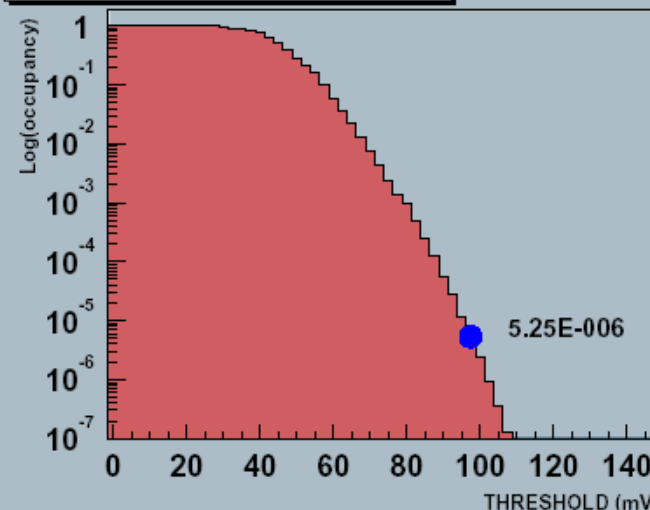
Noise occupancy module 06 Bergen, 0° C, grounding 2

ATLAS SCT Noise Occupancy - log scale - Sat Feb 15 18:29:13 2003 - BERGEN

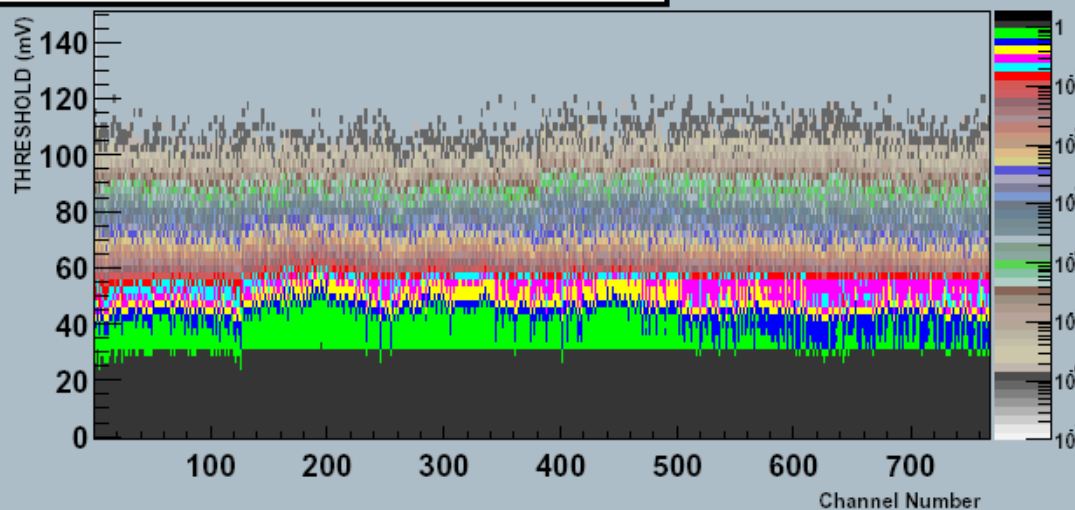Page 1   Run 674   Scan 53   Module 0 (20220380200006) - Type .
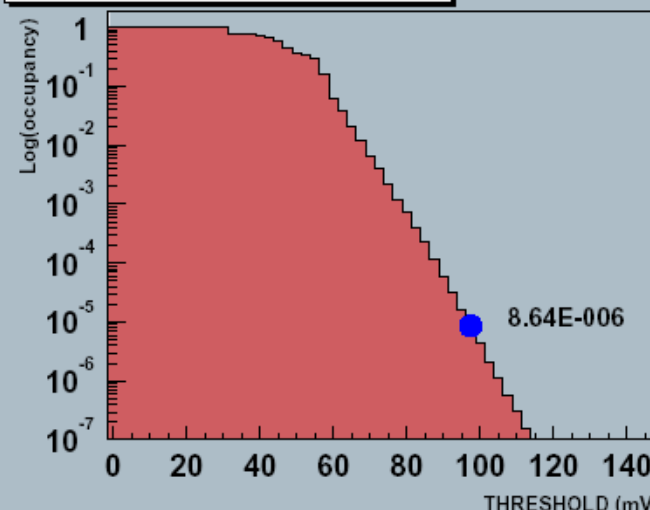
S-curves module 06 Uppsala, 0° C, grounding 2

ATLAS SCT Noise Occupancy S-Curves - Tue Jan 28 15:24:03 2003 - Uppsala
Page 2 Run 219 Scan 53 Module 0 (20220380200006) - Type Barrel_Module
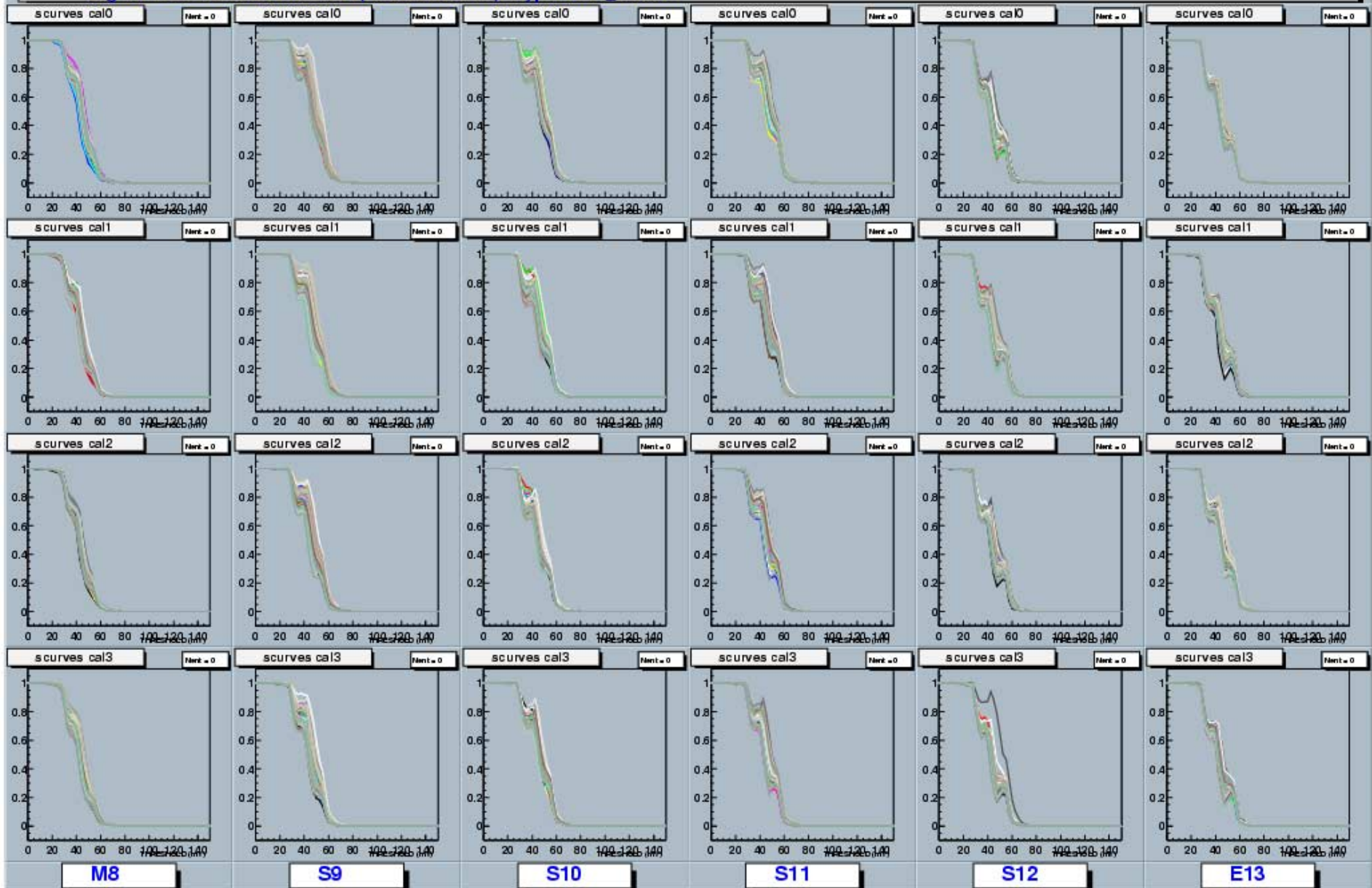
S-curves module 06 Bergen, 0° C, grounding 3

ATLAS SCT Module Test - Mon Feb 10 21:36:12 2003 - Bergen - Module 20220380200006
Run 650 Scan 53 Module 0 Link 1 - THRESHOLD (mV) from 0.00mV to 150.00mV in 2.50mV steps, total 61 points

Chip 0 Chip 1 Chip 2 Chip 3 Chip 4 Chip 5
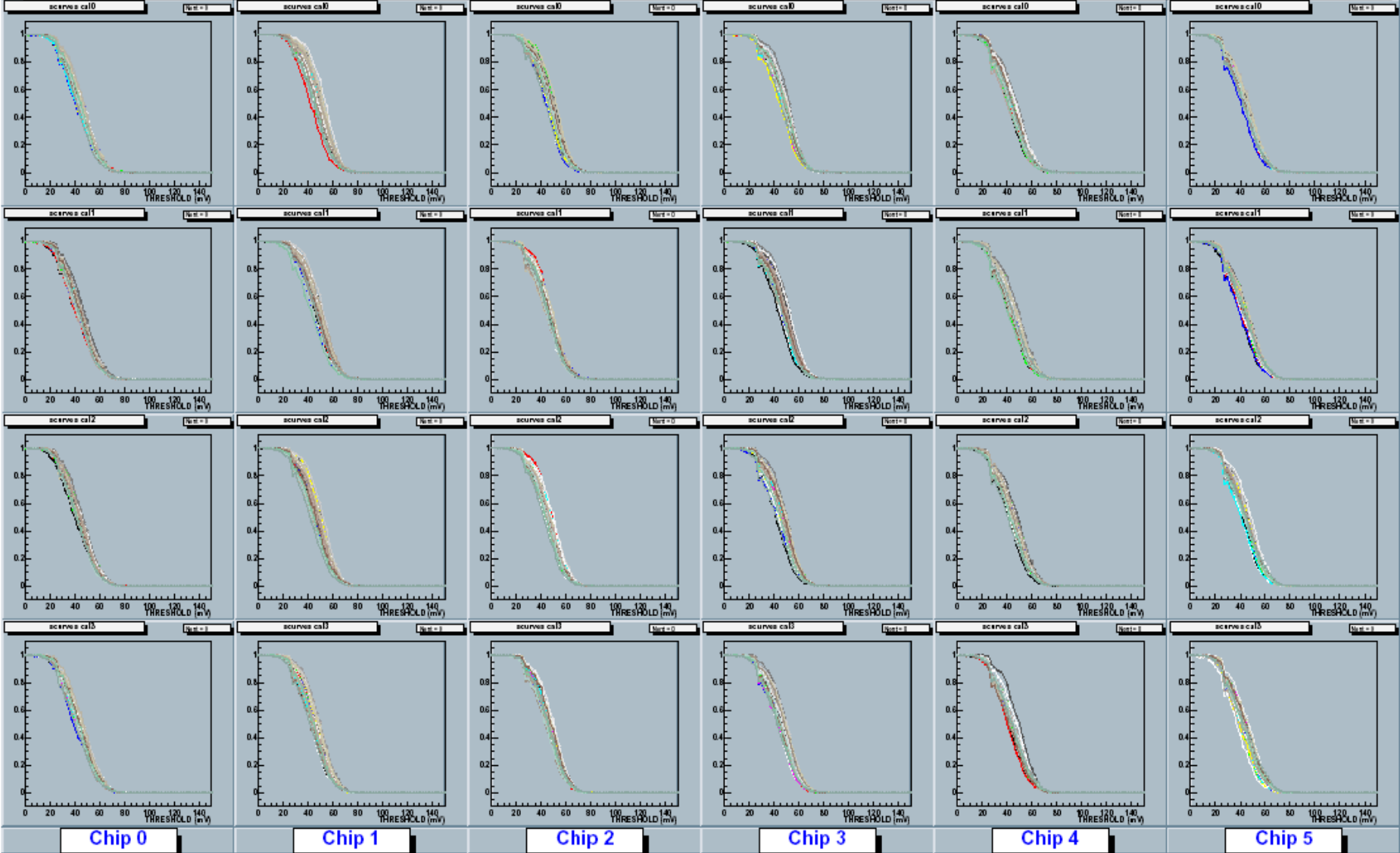
Noise Occupancy module 06 Bergen, 0° C, grounding 3

ATLAS SCT Noise Occupancy - log scale - Mon Feb 10 21:36:12 2003 - Bergen

Page 1   Run 650   Scan 53   Module 0 (20220380200006) - Type .
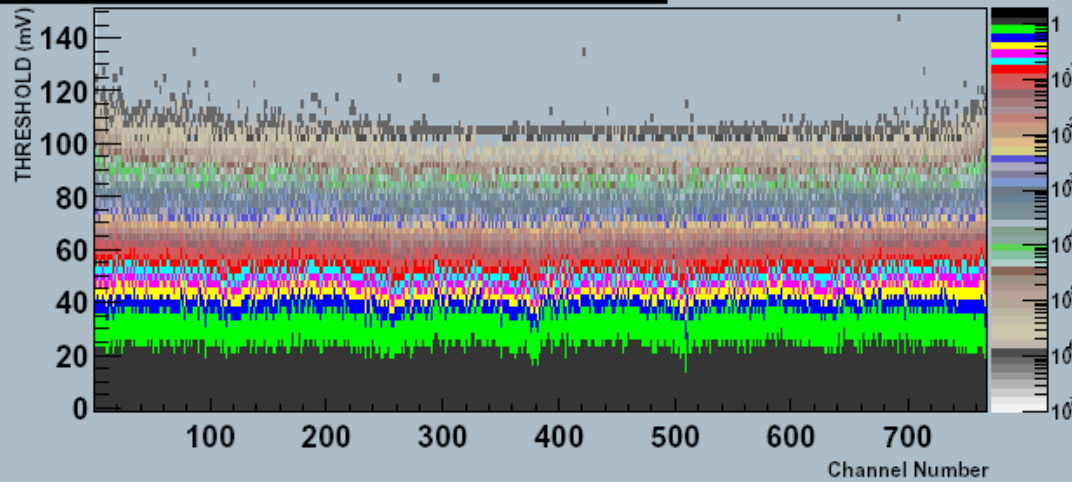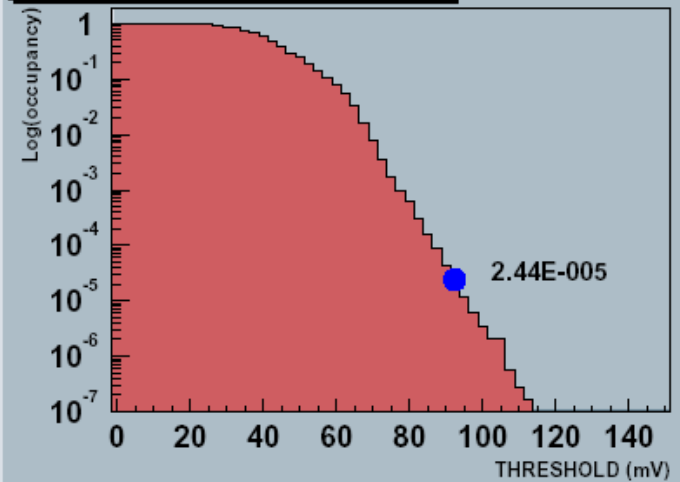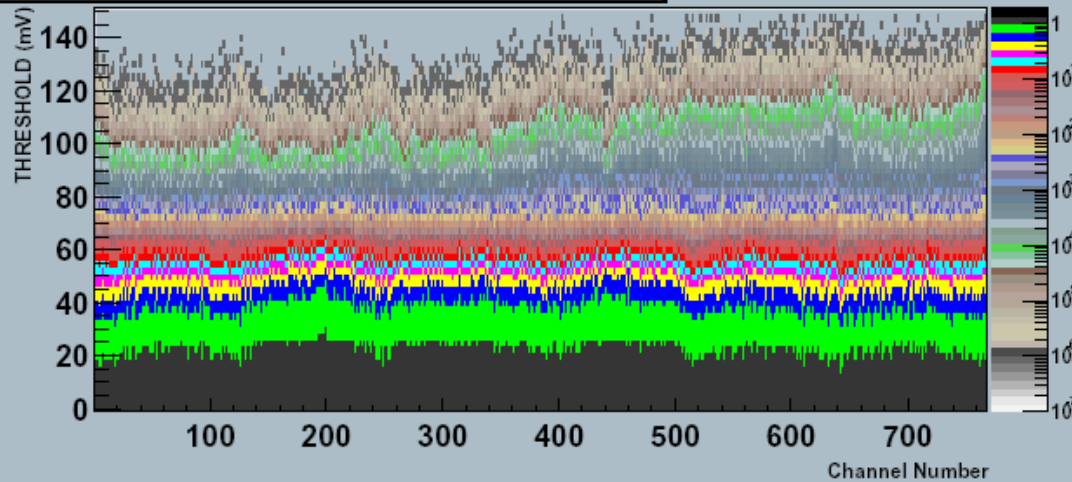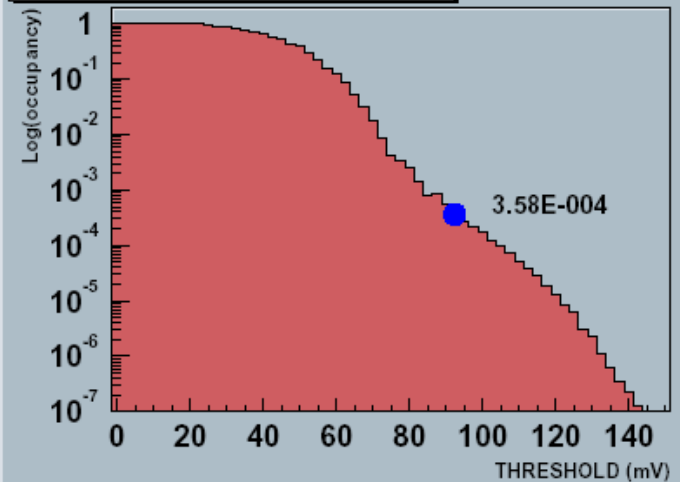
S-curves module 08 Bergen, 0° C, grounding 1

ATLAS SCT Noise Occupancy S-Curves - Fri Feb 14 03:45:33 2003 - UNKNOWN
Page 2 Run 669 Scan 54 Module 0 (20220380200008) - Type .
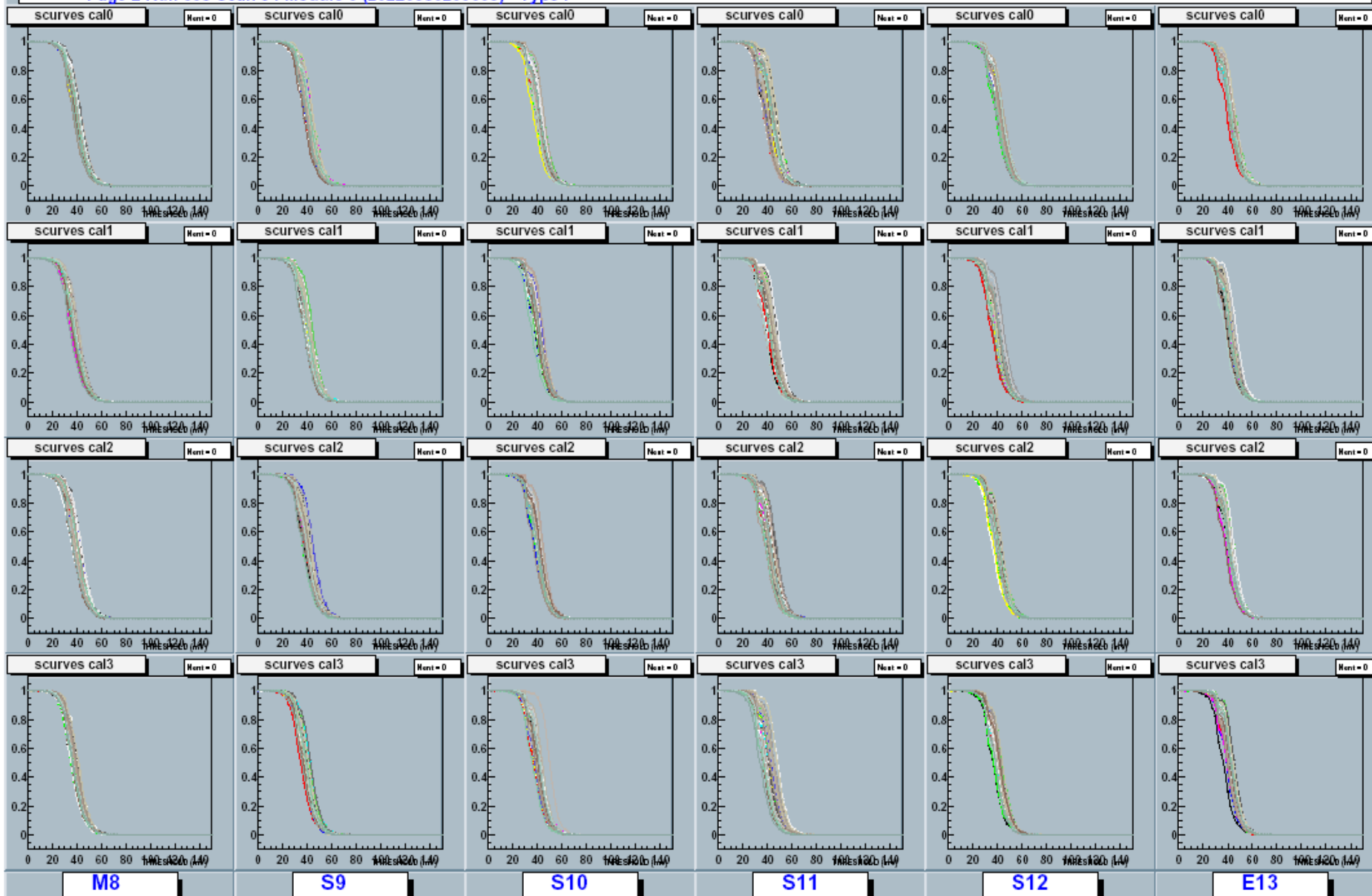
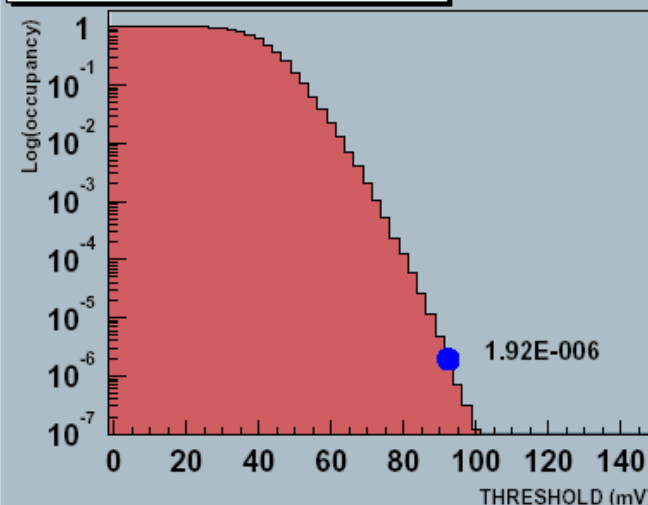# Noise Occupancy module 08 Bergen, 0° C, grounding 1

ATLAS SCT Noise Occupancy - log scale - Fri Feb 14 03:45:33 2003 - UNKNOWN

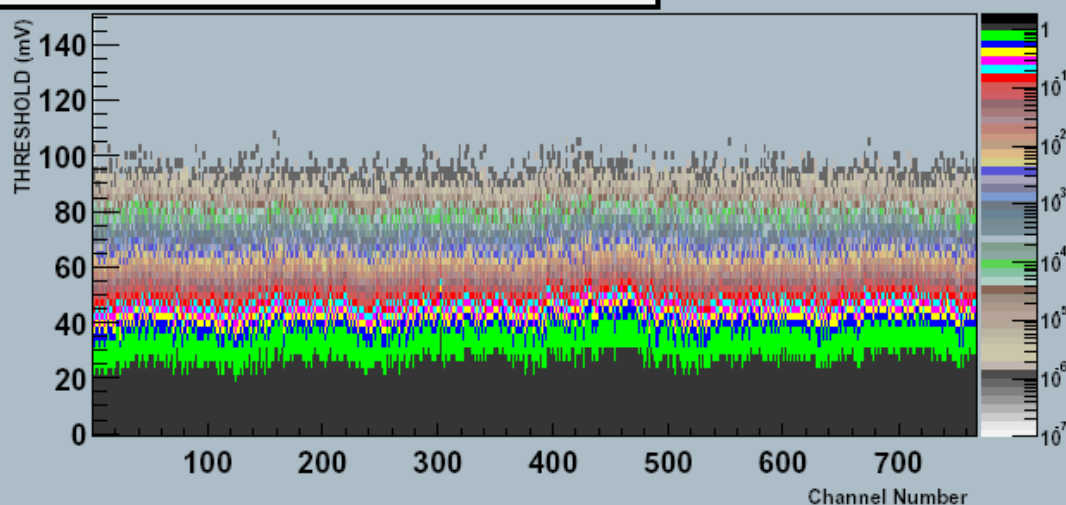Page 1   Run 669   Scan 54   Module 0 (20220380200008) - Type .

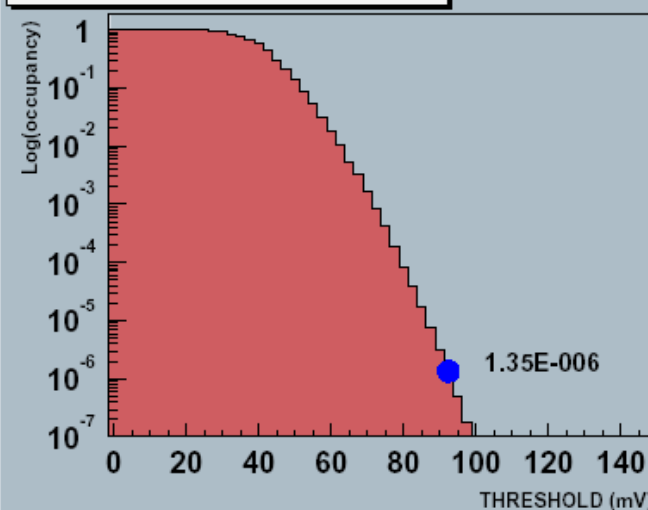Module 0 20220380200008 Stream 0 THRESHOLD (mV) Scan
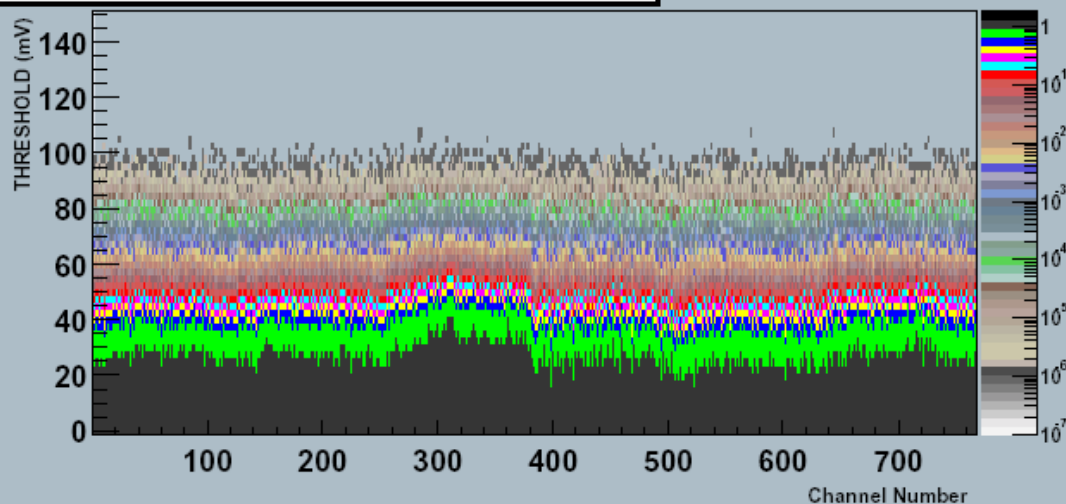
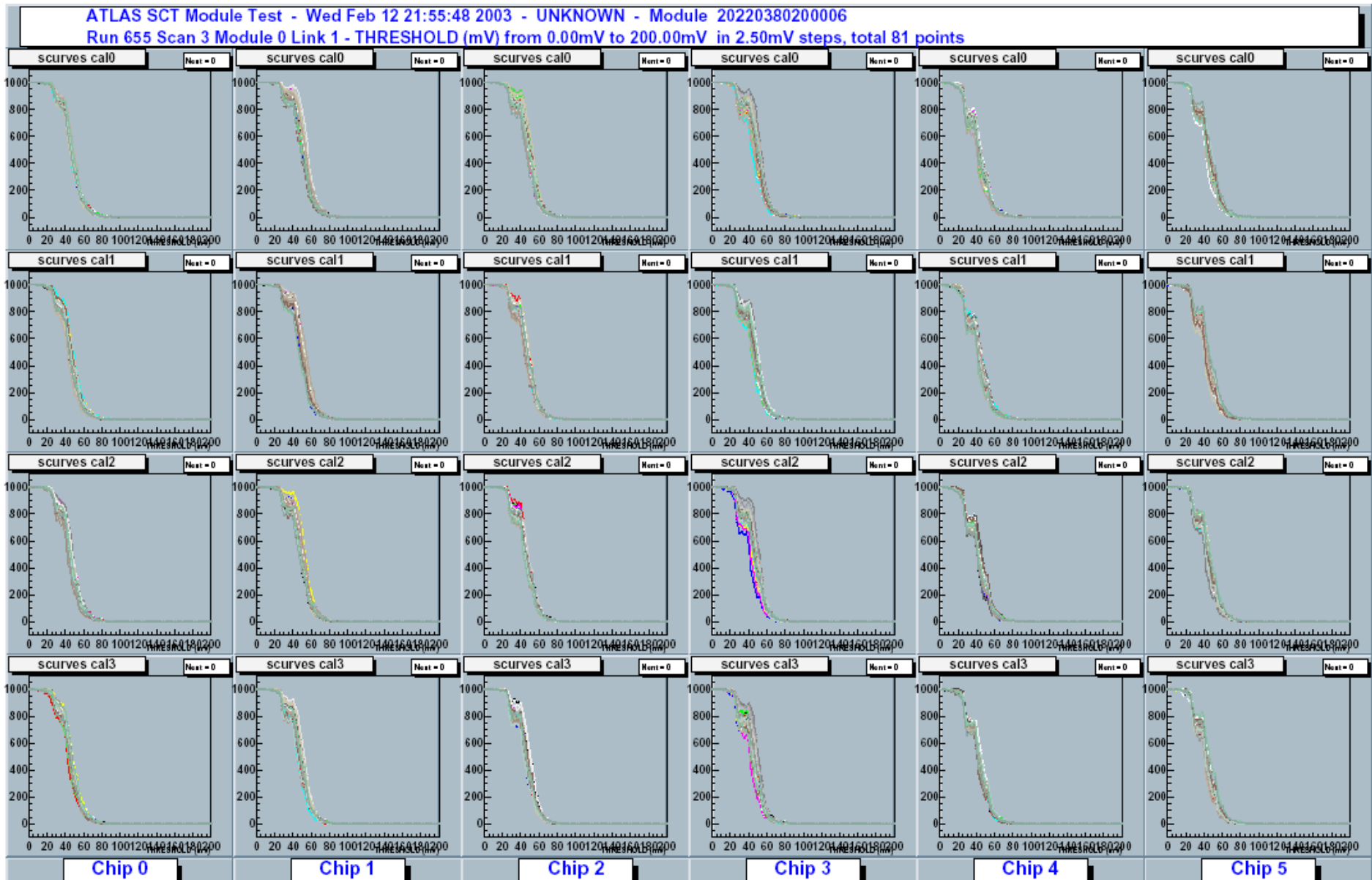Module 0 20220380200008 Stream 0 THRESHOLD (mV) Scan

1.92E-006

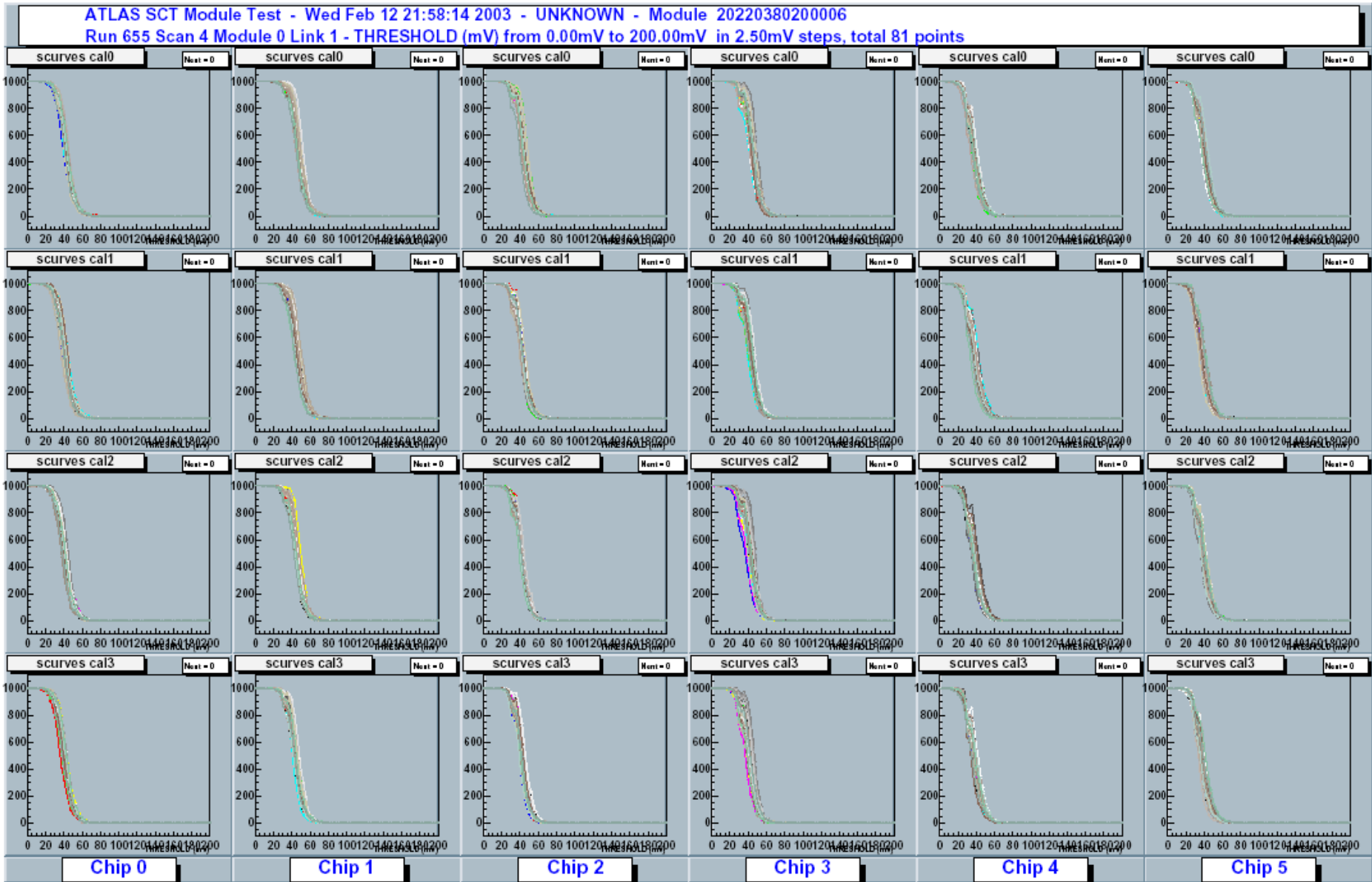Module 0 20220380200008 Stream 1 THRESHOLD (mV) Scan

Module 0 20220380200008 Stream 1 THRESHOLD (mV) Scan

1.35E-006

M06 Bergen, 0° C, grounding 1, threshold scan with 0 fC input charge and Vcc=3.8 V, Vdd=4.3 V


ATLAS SCT Module Test - Wed Feb 12 21:55:48 2003 - UNKNOWN - Module 20220380200006
Run 655 Scan 3 Module 0 Link 1 - THRESHOLD (mV) from 0.00mV to 200.00mV in 2.50mV steps, total 81 points

M06 Bergen, 0° C, grounding 1, threshold scan with 0 fC input charge and Vcc=3.2 V, Vdd=3.8 V

ATLAS SCT Module Test - Wed Feb 12 21:58:14 2003 - UNKNOWN - Module 20220380200006
Run 655 Scan 4 Module 0 Link 1 - THRESHOLD (mV) from 0.00mV to 200.00mV in 2.50mV steps, total 81 points

M09 Bergen, s-curves at 0° C (purple) and 27° C (orange) for 32 last channels link1 (20 mV offset for readability)
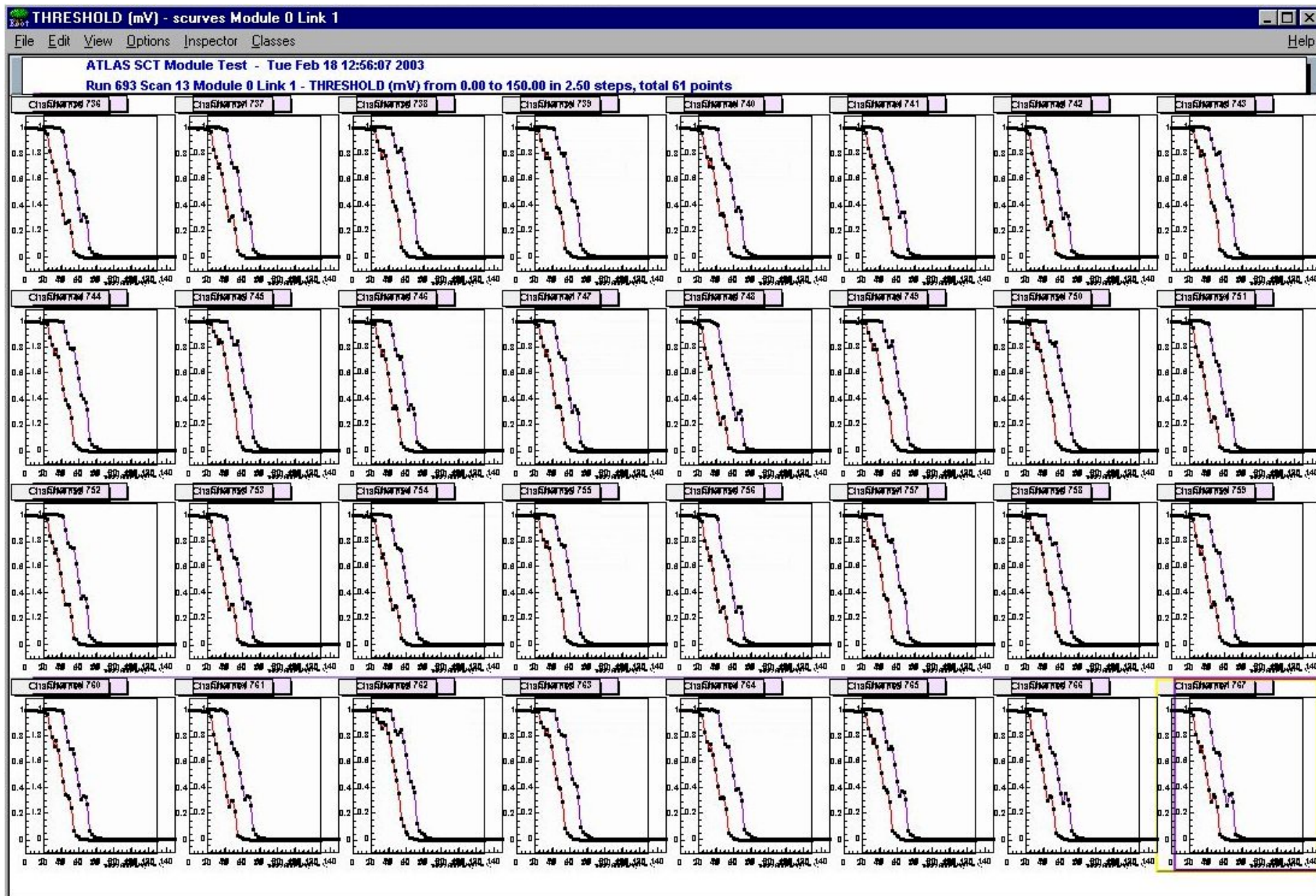
Chisq/NDF vs Input Charge for oscillating and non-oscillating modules
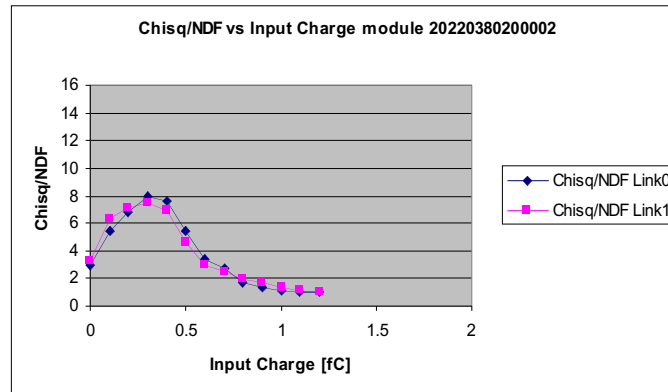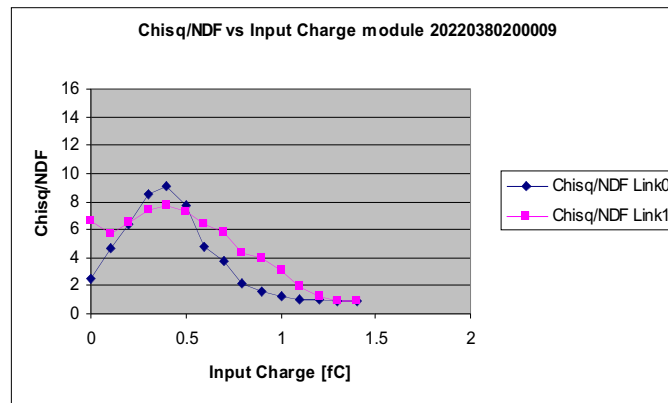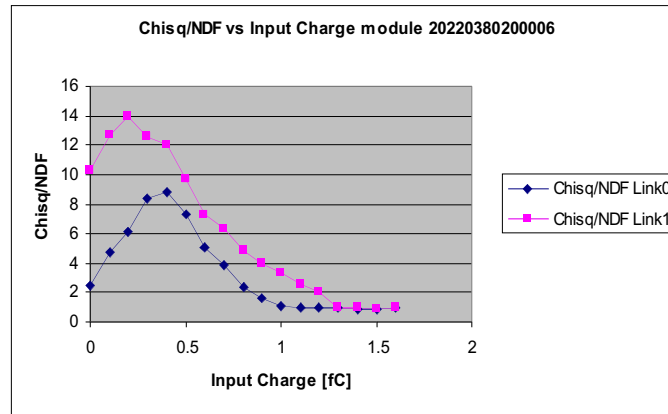
Summary of oscillation problem in Scandinavian Cluster:

• **Characterisations OK, but we see oscillations in s-curves for about 50 % of the modules.**

• **The oscillations in Bergen and Uppsala look very similar, indicates that the oscillations is a module problem?**

• **Grounding have some effect on oscillations:**

> Module frame floating or connected to AGND or DGND on module patchcard gives good noise occupancy values, but oscillations on some modules.

> Module frame grounded to AGND or DGND on SCT-LV-3 through separate cable gives less oscillations, but too high noise occupancy.

> Module frame to SENSE wires gives oscillations and noise occupancies between that of 1 and 2.

• **Oscillations reduce with reduced Vdd/Vcc and increase with increased Vdd/Vcc.**

• **Oscillations do not show significant dependence on temperature.**

• **Oscillations vanish for injected calibration charges > ~1.0 fC.**

• **Shielded cable from RAL/Berkley instead of standard flat cable did not have any effect on oscillations.**