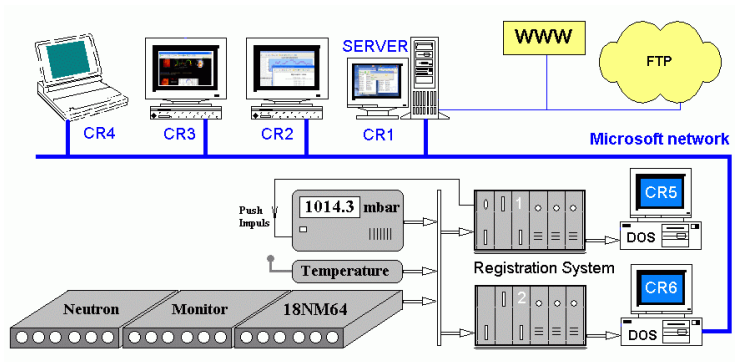


Real-time database for high resolution Neutron Monitor measurements

Christian T. Steigies, Manfred Thomann, Oliver Rother,
Robert F. Wimmer-Schweingruber, Bernd Heber

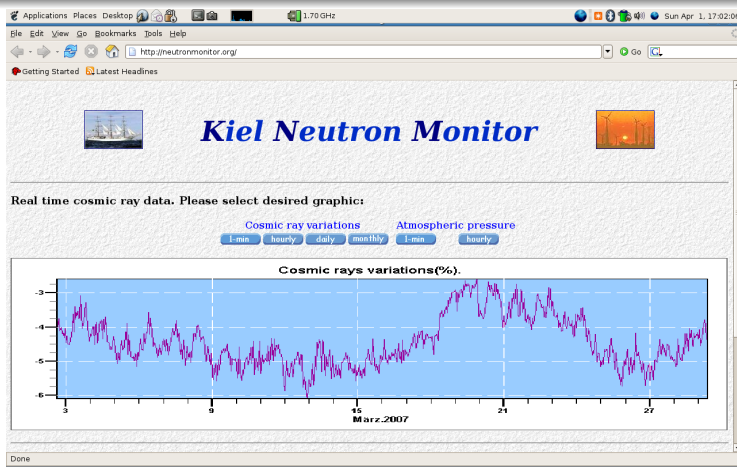
Institut für Experimentelle und Angewandte Physik
Abteilung Extraterrestrische Physik
Christian-Albrechts-Universität zu Kiel

Athens, 03.04.2007



- registration by CR5 only
- pressure and geometry correction on server

Current registration system



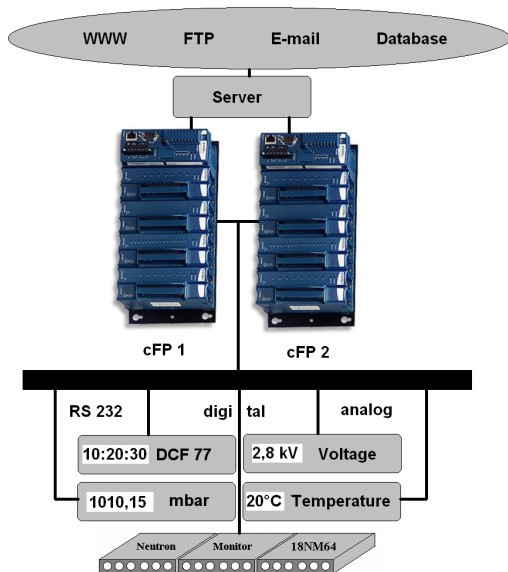
- Updated (approximately) once per day
- data available via www and ftp
- windows server crashes frequently

New registration system

objectives

- run in parallel to existing registration system (calibration)
- provide bin files in a format compatible to existing system
- provide measurements in (near-)realtime
- provide higher resolution (10-sec) data
- improve timing accuracy (DCF77 clock)
- improve pressure measurement resolution

New registration system



cFP registration

- redundant fieldpoints
- redundant DC powersupplies
- digital, analog and serial inputs
- ethernet connection
- compact flash storage
- DCF77 clock
- Barometer with 0.01 mbar resolution
- housekeeping data

compact Field Point



DCF77 clock



- serial connection
- built-in quartz clock as backup

new barometer



Barometer BM35

- serial connection
- internal storage
- 0.01 mbar resolution

New registration system

design of the new registration system

- cFP records raw counts, pressure, housekeeping data
- cFP performs geometry and pressure correction
- data is stored on compact flash media
- data is pushed from cFP via ftp to ftp server
- (data is pulled from ftp server to database server)
- data is imported in MySQL database
- (static plots are generated with new data)
- webserver accesses MySQL database to generate plots
- MySQL database can be replicated by remote machines

demonstration database

Showing rows 385410 - 385430 (385,431 total, Query took 0.3517 sec)

—SQL query:—

```
SELECT *
FROM `cfp1`
LIMIT 385410 , 30
```

[Edit] [Explain SQL] [Create PHP Code] [Refresh]

—Query results operations—

Print view Print view (with full texts) Export

<< < Show : 30 row(s) starting from record # 0 Page number: 12848
 in horizontal mode and repeat headers after 100 cells

Sort by key: None Go

		datetime	cr1	cr2	pressure	cr cr
<input type="checkbox"/>			2007-03-23 15:39:00	111	70	1012.12 90
<input type="checkbox"/>			2007-03-23 15:39:10	222	156	1012.12 189
<input type="checkbox"/>			2007-03-23 15:39:20	316	244	1012.12 280
<input type="checkbox"/>			2007-03-23 15:39:30	421	345	1012.12 383
<input type="checkbox"/>			2007-03-23 15:39:40	540	432	1012.12 486
<input type="checkbox"/>			2007-03-23 15:39:50	642	519	1012.12 580
<input type="checkbox"/>			2007-03-23 15:40:00	103	89	1012.14 96
<input type="checkbox"/>			2007-03-23 15:40:10	198	182	1012.14 190
<input type="checkbox"/>			2007-03-23 15:40:20	316	268	1012.14 292

Database: nm64 (3)

nm64 (3)

- cfp1
- cfp2
- nm1h

Done

cFP database

Applications Places Desktop 1.70 GHz Sun Apr 1, 17:10:43

File Edit View Go Bookmarks Tools Help

http://localhost/phpmyadmin/index.php?lang=en-utf-8&token=ee7df3c775ce850a9e4d0671ad17aab

Getting Started Latest Headlines

Server: localhost > Database: nm64 > Table: cfp2

Browser Structure SQL Search Insert Export Import Operations Empty Drop

Showing rows 30 - 52 (53 total, Query took 0.0095 sec)

SQL query
16.82 -
17.09 - 44.3
Last 50 - 51

[Edit] [Explain SQL] [Create PHP Code] [Refresh]

Query results operations
Print view Print view (with full text) Export

Show: 50 rows (a) starting from record 4 Page number: 2

in horizontal mode and repeat headers after 100 cells

Sort by key: None

	datetime	ar01	ar02	ar03	ar04	ar05	ar06	ar07	ar08	ar10	ar11	ar12	ar13	ar14	ar15	ar16	ar17	pressure	u1	u2	u3	u4	u5	u6	u7	u8	u9	u10	u11	u12	u13	corrected	uncorrected	
2007-02-21 14:06:23	932	418	701	123	595	883	711	845	140	303	649	526	871	720	983	618	35	125	975.00	10	10	10	10	10	10	10	10	10	10	10	10	10	985	735
2007-02-21 14:06:22	61	380	257	448	942	505	778	718	553	978	610	786	434	134	576	700	259	726	950.00	10	10	10	10	10	10	10	10	10	10	10	10	295	554	
2007-02-21 14:06:43	108	594	432	518	872	438	381	7	890	83	637	868	709	981	961	300	206	507	1023.00	10	10	10	10	10	10	10	10	10	10	10	10	738	628	
2007-02-21 14:06:53	622	781	764	746	628	823	96	633	240	369	454	412	870	368	896	218	372	914	966.00	10	10	10	10	10	10	10	10	10	10	10	10	458	628	
2007-02-21 14:07:02	406	681	635	21	218	462	149	282	46	29	761	278	717	295	700	237	956	960	980.00	10	10	10	10	10	10	10	10	10	10	10	240	426		
2007-02-21 14:07:13	153	101	847	172	85	323	268	675	84	281	130	561	875	773	776	436	558	239	1005.00	10	10	10	10	10	10	10	10	10	10	10	426	426		
2007-02-21 14:07:23	588	434	244	177	679	448	846	965	943	540	177	425	140	759	876	860	849	416	905.00	10	10	10	10	10	10	10	10	10	10	10	397	536		
2007-02-21 14:07:43	584	291	895	278	150	322	19	373	639	117	46	565	124	675	809	712	754	882	1034.00	10	10	10	10	10	10	10	10	10	10	10	852	639		
2007-02-21 14:07:53	732	317	891	110	129	810	714	517	400	278	895	645	88	445	860	392	967	706	958.00	10	10	10	10	10	10	10	10	10	10	10	439	659		
2007-02-21 14:08:03	643	901	688	322	568	7	430	577	299	169	884	785	333	879	911	754	238	374	990.00	10	10	10	10	10	10	10	10	10	10	10	565	637		
2007-02-21 14:52:59	532	197	445	184	121	364	181	214	179	516	260	903	27	153	905	9	224	789	1023.00	0	0	0	0	0	0	0	0	0	0	0	306	260		
2007-02-21 14:53:09	619	815	748	524	901	412	721	872	142	444	317	532	632	709	221	104	241	132	952.00	0	0	0	0	0	0	0	0	0	0	0	418	619		
2007-02-21 14:53:13	415	736	120	36	546	54	53	501	96	747	498	547	225	427	811	878	778	615	1014.00	0	0	0	0	0	0	0	0	0	0	0	2207	2932		
2007-02-21 14:53:23	395	560	595	251	768	829	39	953	480	631	38	483	18	934	151	128	329	617	953.00	0	0	0	0	0	0	0	0	0	0	0	791	1115		
2007-02-21 14:53:23	916	235	621	426	27	779	303	231	651	1000	987	12	400	688	277	275	774	964.00	0	0	0	0	0	0	0	0	0	0	0	0	624	826		
2007-02-21 13:38:23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1023.00	0	0	0	0	0	0	0	0	0	0	0	0	0		

Done

Summary

Summary

- cFP demonstration system is running with two counters
- data on ftp server is updated every 5 minutes
- data on mysql server is updated every 15 minutes
- database stores data in 10-sec resolution
- database provides averaged data
- plot routine can perform pressure correction
- open access to data
- open source database and webserver software (LAMP)