



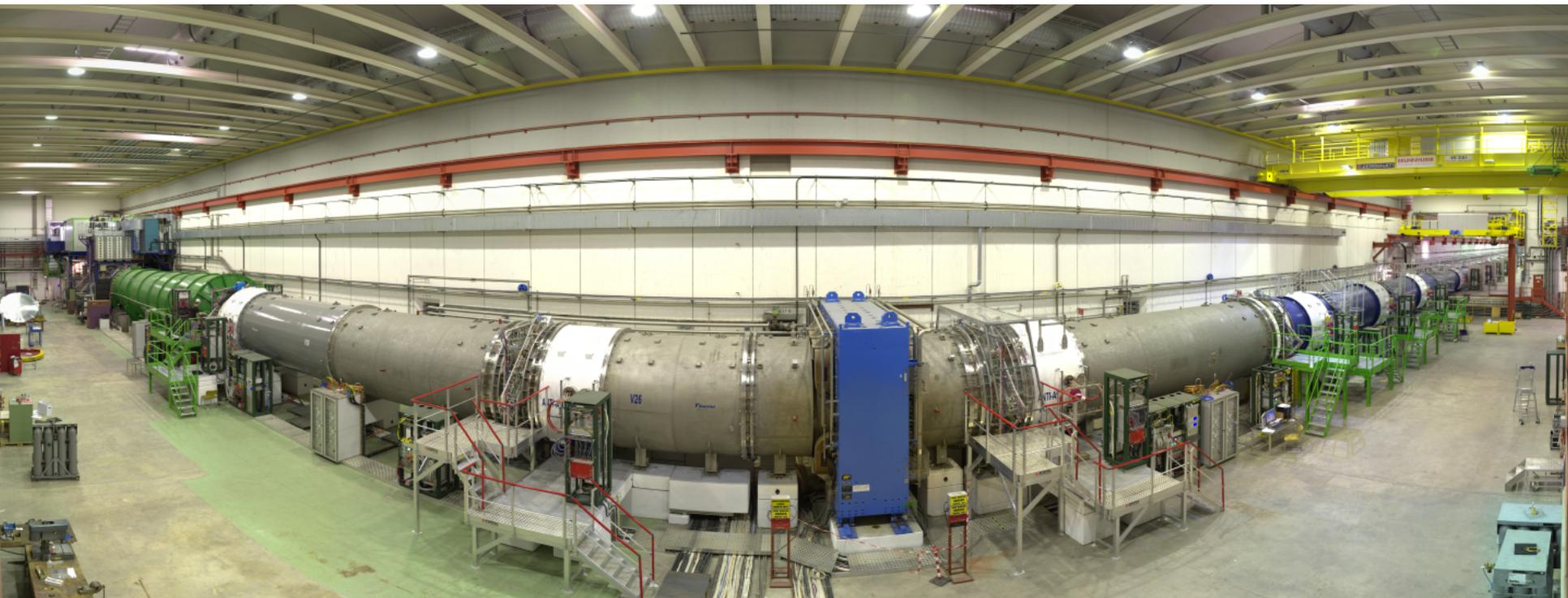
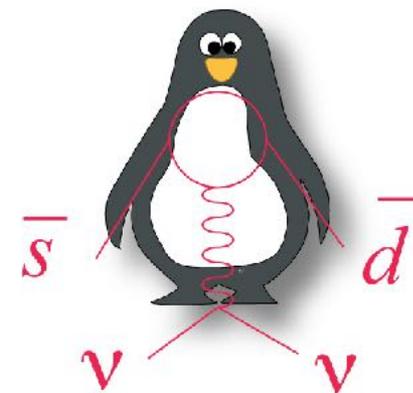
NA62 Data

Paul Laycock

NA62 in few words

Measure branching ratio of $K \rightarrow \pi \nu \bar{\nu}$
 predicted with 10% precision to be 10^{-10}

Need to have 10^{12} kaon decays to make a 10% measurement



Data Challenge

	events / day (billions)	raw data / day (TB / day)	reco data / day (TB / day)
NA62	~1	10	20

Unit of data-taking is an SPS burst, which last 3-5 seconds

Take 4000 SPS bursts / day, 250k events per burst

Event size of ~10kB, ~2.5 GB per burst

One DAQ Run is ~1500 bursts, granularity at which data is calibrated (though high precision / high rate detectors are also calibrated at burst level)

Fully reconstructed data is NA62 ~twice the size of raw (similar to ATLAS ESD)

Data Reduction

	events / day (billions)	raw data / day (TB / day)	reco data / day (TB / day)	filtered reco / day (TB / day)
NA62	~1	10	20	10 (~ 10 * 1)

Unit of data-taking is an SPS burst, which last 3-5 seconds

Take 4000 SPS bursts / day, 250k events per burst

Event size of ~10kB, ~2.5 GB per burst

One DAQ Run is ~1500 bursts, granularity at which data is calibrated (though high precision / high rate detectors are also calibrated at burst level)

Fully reconstructed data is NA62 ~twice the size of raw, **not retained**

Reconstructed data is filtered to reduce data volume by ~20, writing ~10 filters

~200 physicists on NA62 start with filtered datasets

Data Processing

Task Lister

Monitor | Task Lister | Dataset Lister | Charts | Change Password | Change AMI Tag Config | Dataset Sign-off | Dataset Stage-in (conTZole 2.7.6)

Run Nr	Task Name	User	taskID	Type	Status	Total	Done	Run.	Proc.	TBD	Abtr.	Failed	Events	Created (UTC)	Modified (UTC)
8215	na62_2017.008215.DQ1_p.03-v0.11.1_dq1.03-v0.11.1_dq2.03-v0.11.1.po...	tzna62	1222	post	FINISHED	1	1	0	0	0	0	0	n/a	21/DEC 22:15	21/DEC 23:27
8215	na62_2017.008215.BEAMPARS_p.03-v0.11.1_f.03-v0.11.1_bp.03-v0.11.1...	tzna62	1221	post	FINISHED	1	1	0	0	0	0	0	n/a	21/DEC 18:23	21/DEC 18:32
8215	na62_2017.008215.RECO_p.03-v0.11.1_dq1.03-v0.11.1.post.task	tzna62	1219	post	FINISHED	477	477	0	0	0	0	1	n/a	21/DEC 16:09	21/DEC 22:15
8215	na62_2017.008215.RES3TV_p.03-v0.11.1_f.03-v0.11.1_bp.03-v0.11.1.po...	tzna62	1218	post	FINISHED	48	48	0	0	0	0	0	n/a	21/DEC 16:08	21/DEC 18:22
8215	na62_2017.008215.ALPHABETA_p.03-v0.11.1_f.03-v0.11.1_ab2.03-v0.11...	tzna62	1217	post	FINISHED	1	1	0	0	0	0	0	n/a	21/DEC 15:50	21/DEC 16:07
8215	na62_2017.008215.RECO_p.03-v0.11.1_f.03-v0.11.1.post.task	tzna62	1206	post	FINISHED	477	477	0	0	0	0	0	n/a	21/DEC 11:31	21/DEC 15:47
8215	na62_2017.008215.RAW_p.03-v0.11.1.prod.task	tzna62	1165	prod	FINISHED	1429	1429	0	0	0	0	25	n/a	20/DEC 20:37	21/DEC 11:28
8215	na62_2017.008215.calib.RECO_c4.03-v0.11.1_c4a.03-v0.11.1.calib.task	tzna62	1158	calib	FINISHED	1	1	0	0	0	0	0	n/a	20/DEC 19:50	20/DEC 20:33
8215	na62_2017.008215.calib.RAW_c4.03-v0.11.1.calib.task	tzna62	1140	calib	FINISHED	100	100	0	0	0	0	8	n/a	20/DEC 17:33	20/DEC 19:47
8215	na62_2017.008215.calib.RECO_c3.03-v0.11.1_c3a.03-v0.11.1.calib.task	tzna62	1139	calib	FINISHED	1	1	0	0	0	0	0	n/a	20/DEC 17:29	20/DEC 17:32
8215	na62_2017.008215.calib.RAW_c3.03-v0.11.1.calib.task	tzna62	1132	calib	FINISHED	100	100	0	0	0	0	2	n/a	20/DEC 17:00	20/DEC 17:27
8215	na62_2017.008215.calib.RECO_c2.03-v0.11.1_c2a.03-v0.11.1.calib.task	tzna62	1129	calib	FINISHED	1	1	0	0	0	0	0	n/a	20/DEC 16:52	20/DEC 16:56
8215	na62_2017.008215.calib.RAW_c2.03-v0.11.1.calib.task	tzna62	1112	calib	FINISHED	100	100	0	0	0	0	13	n/a	20/DEC 15:37	20/DEC 16:51
8215	na62_2017.008215.calib.RECO_c1.03-v0.11.1_c1a.03-v0.11.1.calib.task	tzna62	1105	calib	FINISHED	1	1	0	0	0	0	0	n/a	20/DEC 15:00	20/DEC 15:33
8215	na62_2017.008215.calib.RAW_c1.03-v0.11.1.calib.task	tzna62	1089	calib	FINISHED	100	100	0	0	0	0	297	n/a	20/DEC 13:17	20/DEC 14:57

*Using Atlas Tier0 Production System (Luc Goosens, Armin Nairz, Jaroslav Guenther)
Adapted for NA62, implemented python interface to NA62 s/w framework*

*Implemented 15 production step workflow to perform calibration, reco, filter and DQ
In addition there are many custom processes*

Production runs on HTCondor at CERN, outputs stored on eos

Data Analysis

Task Lister

Monitor | Task Lister | Dataset Lister | Charts | Change Password | Change AMI Tag Config | Dataset Sign-off | Dataset Stage-in (contZole 2.7.6)

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8215	na62_2017.008215.RECO_p.03-v0.11.1_dq1.03-v0.11.1.post.task	tzna62	1219	post	FINISHED	477	477	0	0	0	0	1	n/a	21/DEC 16:09	21/DEC 22:15
8215	na62_2017.008215.RES3TV_p.03-v0.11.1_f.03-v0.11.1_bp.03-v0.11.1.po...	tzna62	1218	post	FINISHED	48	48	0	0	0	0	0	n/a	21/DEC 16:08	21/DEC 18:22
8215	na62_2017.008215.ALPHABETA_p.03-v0.11.1_f.03-v0.11.1_ab2.03-v0.11...	tzna62	1217	post	FINISHED	1	1	0	0	0	0	0	n/a	21/DEC 15:50	21/DEC 16:07
8215	na62_2017.008215.RECO_p.03-v0.11.1_f.03-v0.11.1.post.task	tzna62	1206	post	FINISHED	477	477	0	0	0	0	0	n/a	21/DEC 11:31	21/DEC 15:47
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8215	na62_2017.008215.calib.RAW_c4.03-v0.11.1.calib.task	tzna62	1140	calib	FINISHED	100	100	0	0	0	0	8	n/a	20/DEC 17:33	20/DEC 19:47
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8215	na62_2017.008215.calib.RAW_c3.03-v0.11.1.calib.task	tzna62	1132	calib	FINISHED	100	100	0	0	0	0	2	n/a	20/DEC 17:00	20/DEC 17:27
8215	na62_2017.008215.calib.RECO_c2.03-v0.11.1_c2a.03-v0.11.1.calib.task	tzna62	1129	calib	FINISHED	1	1	0	0	0	0	0	n/a	20/DEC 16:52	20/DEC 16:56
8215	na62_2017.008215.calib.RAW_c2.03-v0.11.1.calib.task	tzna62	1112	calib	FINISHED	100	100	0	0	0	0	13	n/a	20/DEC 15:37	20/DEC 16:51
8215	na62_2017.008215.calib.RECO_c1.03-v0.11.1_c1a.03-v0.11.1.calib.task	tzna62	1105	calib	FINISHED	1	1	0	0	0	0	0	n/a	20/DEC 15:00	20/DEC 15:33
8215	na62_2017.008215.calib.RAW_c1.03-v0.11.1.calib.task	tzna62	1089	calib	FINISHED	100	100	0	0	0	0	297	n/a	20/DEC 13:17	20/DEC 14:57

Production runs on HTCondor at CERN, outputs stored on eos

Production system has Datasets and Files tables for data management

Custom process queries tables to create filelists for filter datasets for end users

Currently all analysis runs on HTCondor/LSF @ CERN, no DDM

Distributed Data Management?

MC production uses the grid

highly customised production system based on DIRAC

Several sites belong to NA62 VO

Interesting to consider using these sites for real data production, analysis, both?

Not highest priority while NA62 requirements fit at CERN

More future proof if requirements increase significantly, would need a WMS

Still, attractive features like data management for production system (staging from tape, etc.), check that files are (still) on storage, lifetime policy

Key points would be

(seamless !) integration with production system

(seamless !) migration of pfns (can another pfn algo be used?)



Backup