

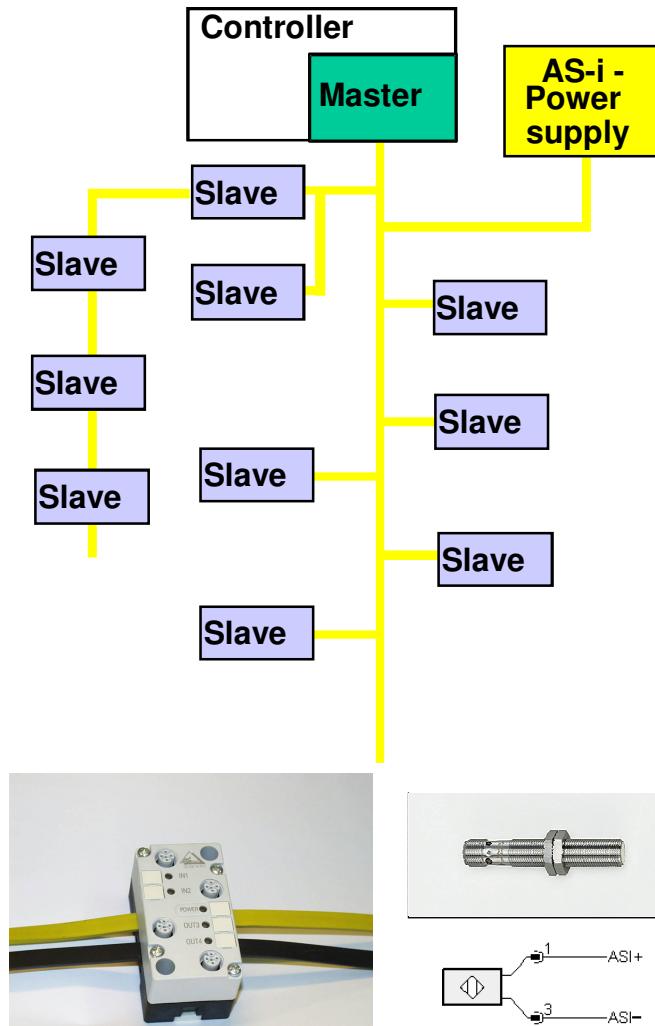
Application of AS-Interface to a Small Angle Neutron Scattering Experiment

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- *Neutron Scattering in Jülich: Heavily based on PLCs and Fieldbus PROFIBUS DP*
- *Possible low-level complement: AS-I (Actuator Sensor Interface)* 
 - *Simple fieldbus system for the lowest field level (actuator and sensor level)*
 - *Internationally standardized in EN50295 and IEC 62026-2*
 - *Optimized for the interconnection of simple binary sensors and actuators*
 - *Well-supported*
- *Evaluation of AS-I in KWS-1, a Small Angle Neutron Scattering Experiment*

Features of AS*i*



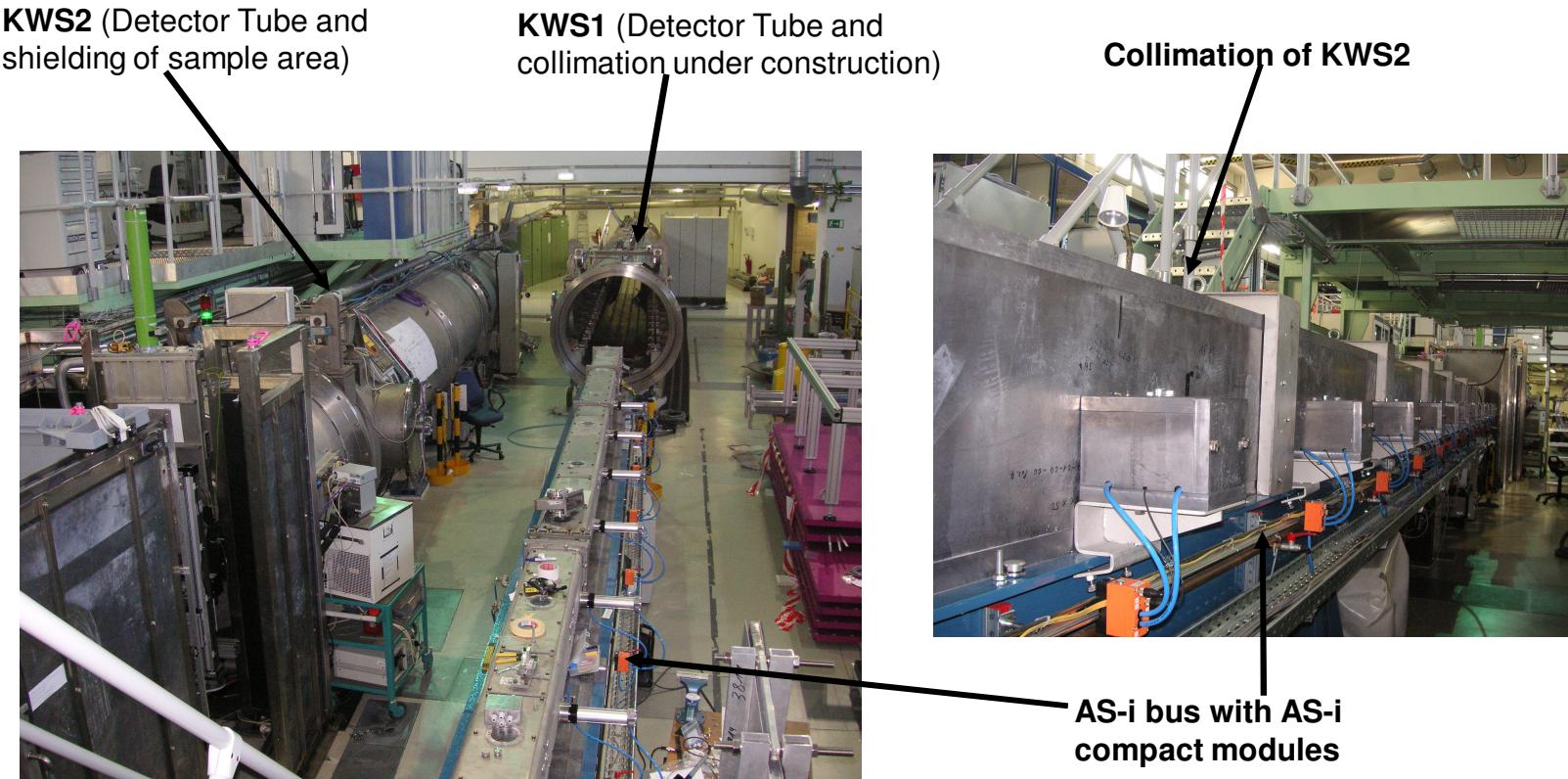
Standardized AS-i
Compact Module (IP67)

Inductive Limit Switch (M12)
with integrated AS-i Interface

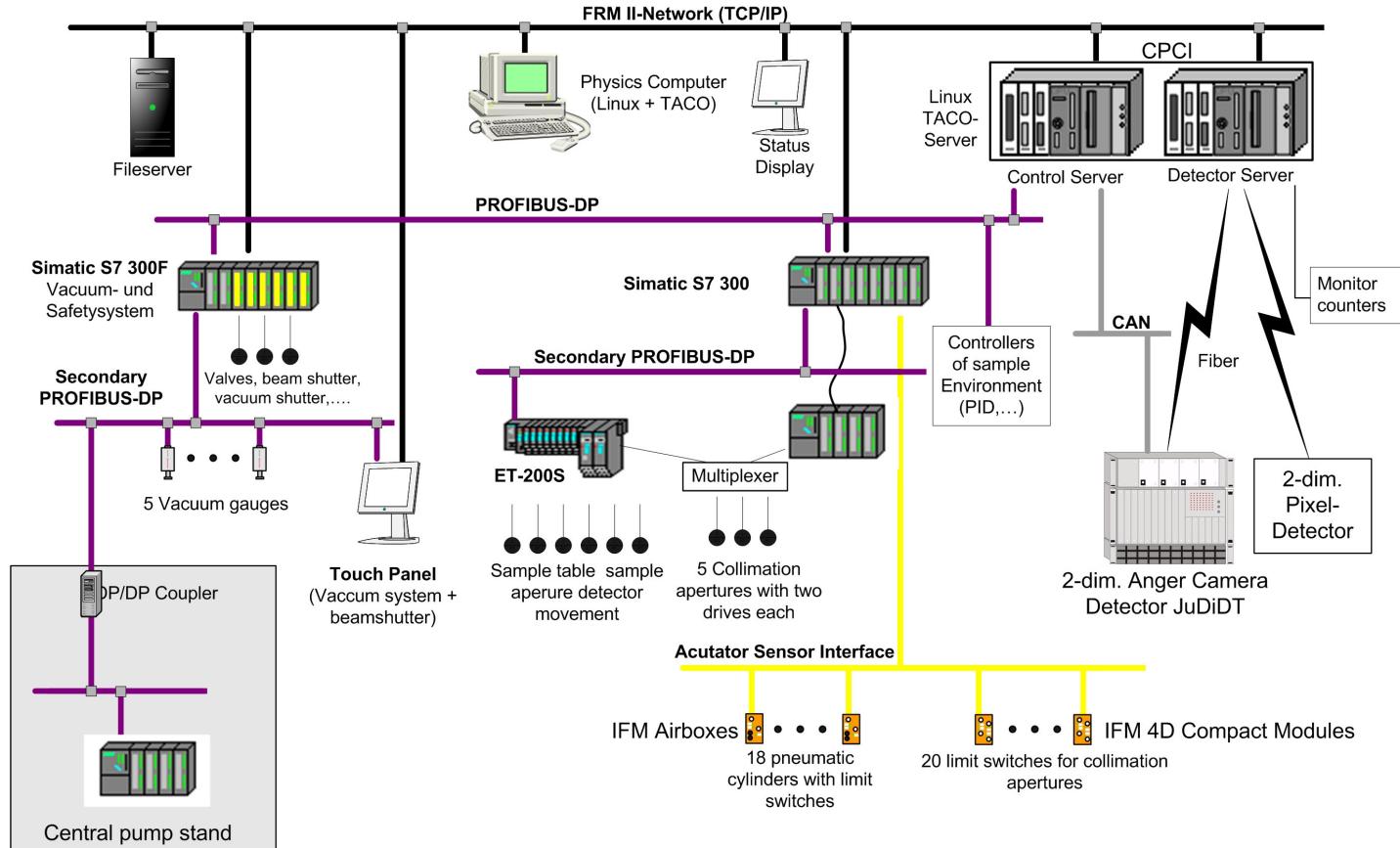
- *Master/Slave system with cyclic polling => deterministic*
- *Reaction time < 5ms*
- *Max. number of slaves: 31 (62 in extended mode)*
- *Data size: 4 Bit*
- *Power + data over same cable*
- *Alternate Pulse Modulation (APM) with 167 kBit/s*
- *Cable: unshielded, not twisted, no termination*
- *Max. cable length: 100m (extensible to 300m via repeater)*
- *Arbitrary topologies: tree, star, ring,.....*

SANS Instruments KWS-1 and KWS-2

- Classical 40m long pinhole instruments for Small Angle Neutron Scattering
- Built and operated by Jülich Centre of Neutron Science (JCNS) at FRM-II
- Collimation: 5 apertures + 18 movable neutron guide segments



Control System of KWS-2



- AS-I bus segment parallel to collimation for pneumatic devices + limit switches
 - Successful Evaluation of AS-I: Major reduction of cabling effort, stable operation, easy programming, good diagnostics
- => use AS-I also in KWS-1