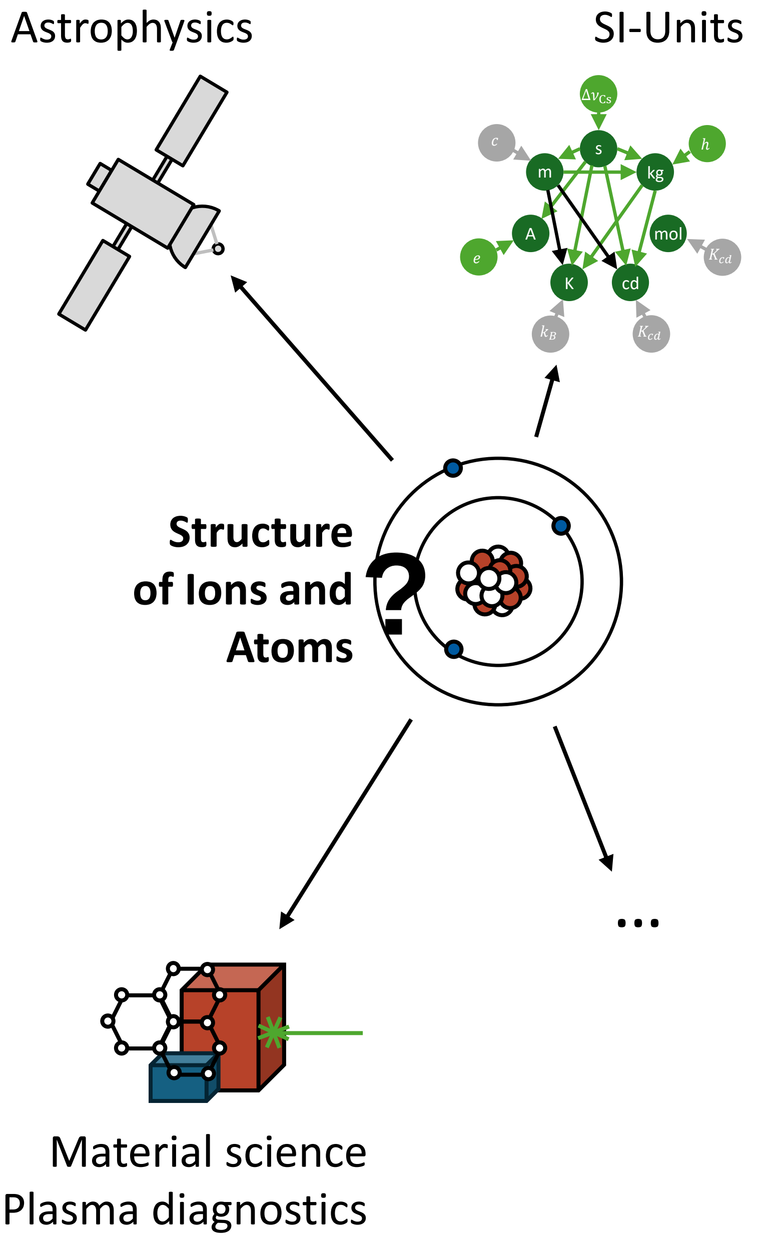
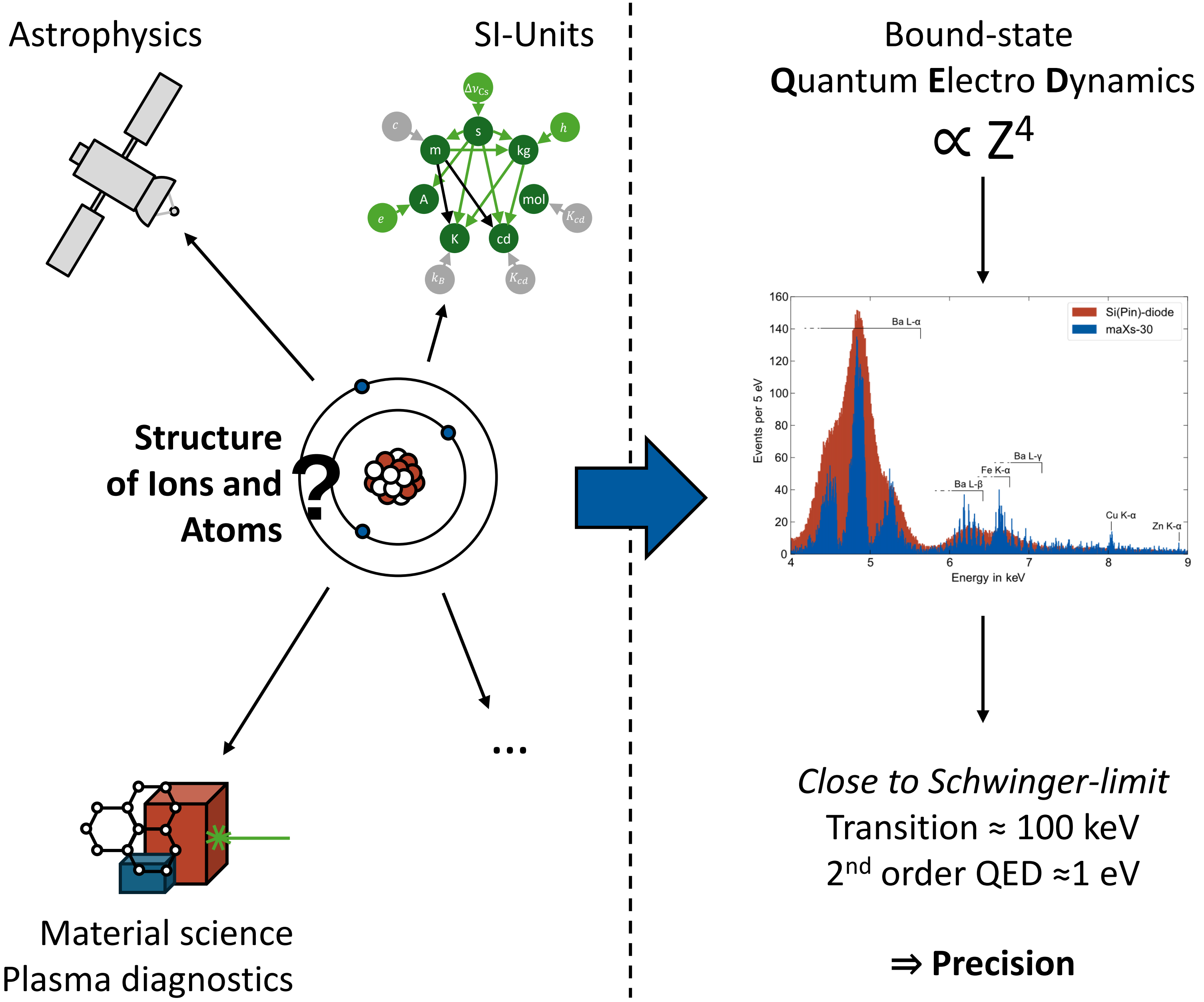
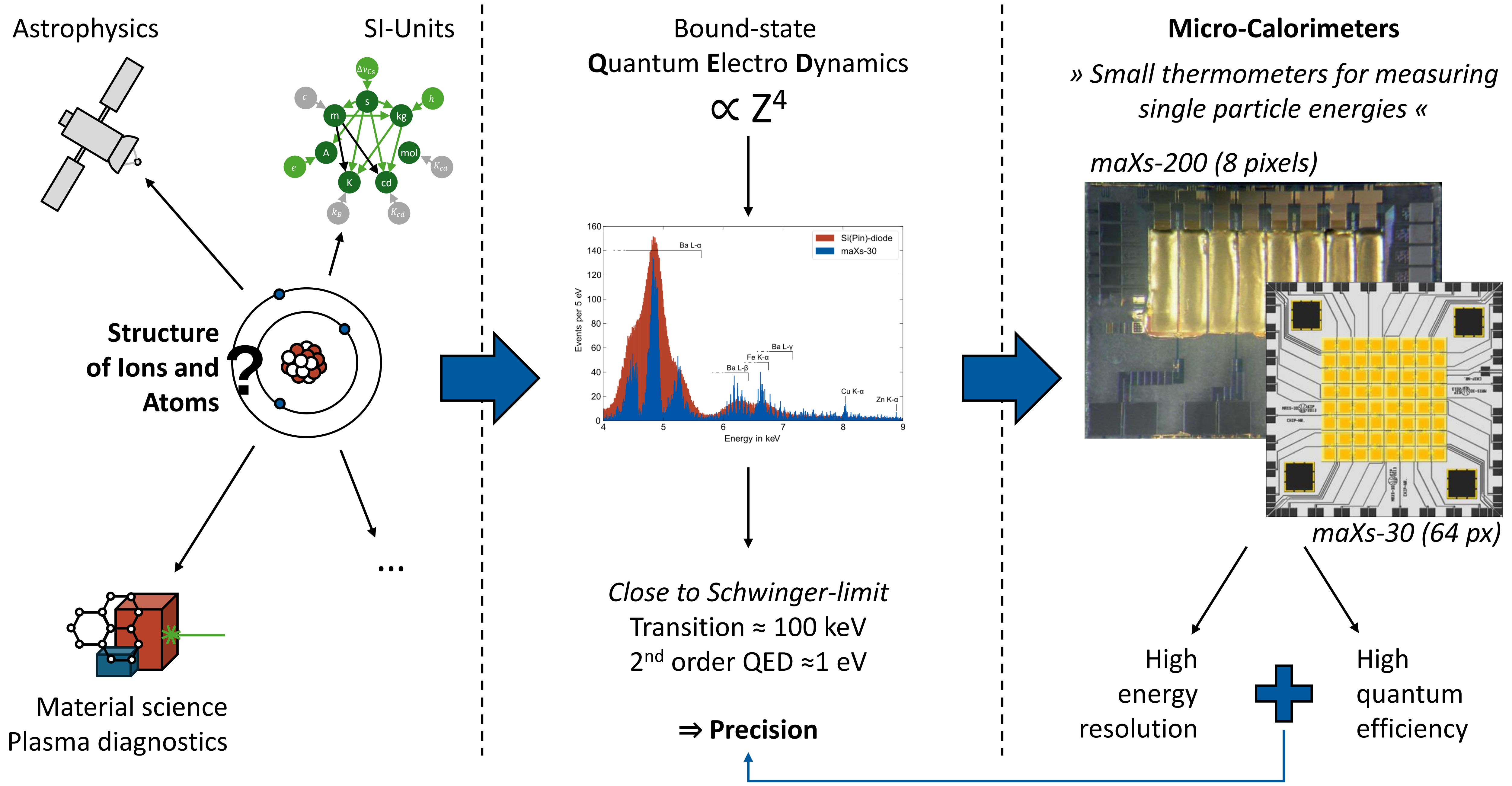

Astrophysics
SI-Units
Structure of Ions and Atoms
?
Material science
Plasma diagnostics
...



Astrophysics
SI-Units
Δν_Cs
c
h
s
m
kg
A
mol
e
K_cd
K
cd
k_B
K_cd
Structure of Ions and Atoms
?
Material science
Plasma diagnostics
...
Bound-state
Quantum Electro Dynamics
∝ Z^4
Events per 5 eV
Energy in keV
Si(Pin)-diode
maXs-30
Ba L-α
Ba L-β
Fe K-α
Ba L-γ
Cu K-α
Zn K-α
0
20
40
60
80
100
120
140
160
4
5
6
7
8
9
Close to Schwinger-limit
Transition ≈ 100 keV
2nd order QED ≈1 eV
⇒ Precision



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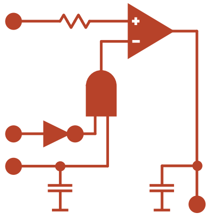
⇒ Precision
Micro-Calorimeters
» Small thermometers for measuring single particle energies «
maXs-200 (8 pixels)
maXs-30 (64 px)
High energy resolution
High quantum efficiency

High sensitivity…
… also to **noise**



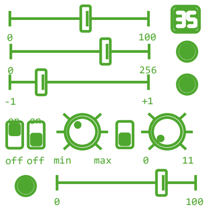
Signal processing:

Analog

```
float get_e
{
  uint32_t
  for ( uin
  {
    float v
    mwd_maf
```

Digital

Compensate artifacts

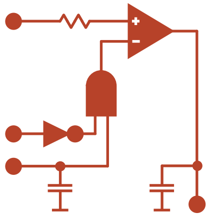


Optimization of many parameters / pixel

⇒ **Future: More Pixels**

> 1000 px

High sensitivity…
… also to **noise**



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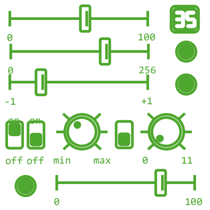


Optimization of many parameters / pixel

⇒ **Future: More Pixels**

> 1000 px

Solution:

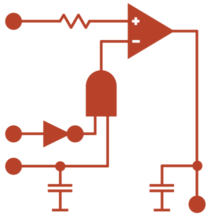
Artificial Intelligence?

Parameter optimization
Signal characterization
1D temporal analysis

…

⇒ **Lots of potential!**

High sensitivity…
… also to **noise**



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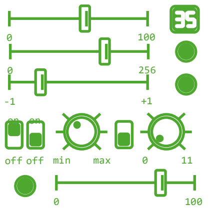

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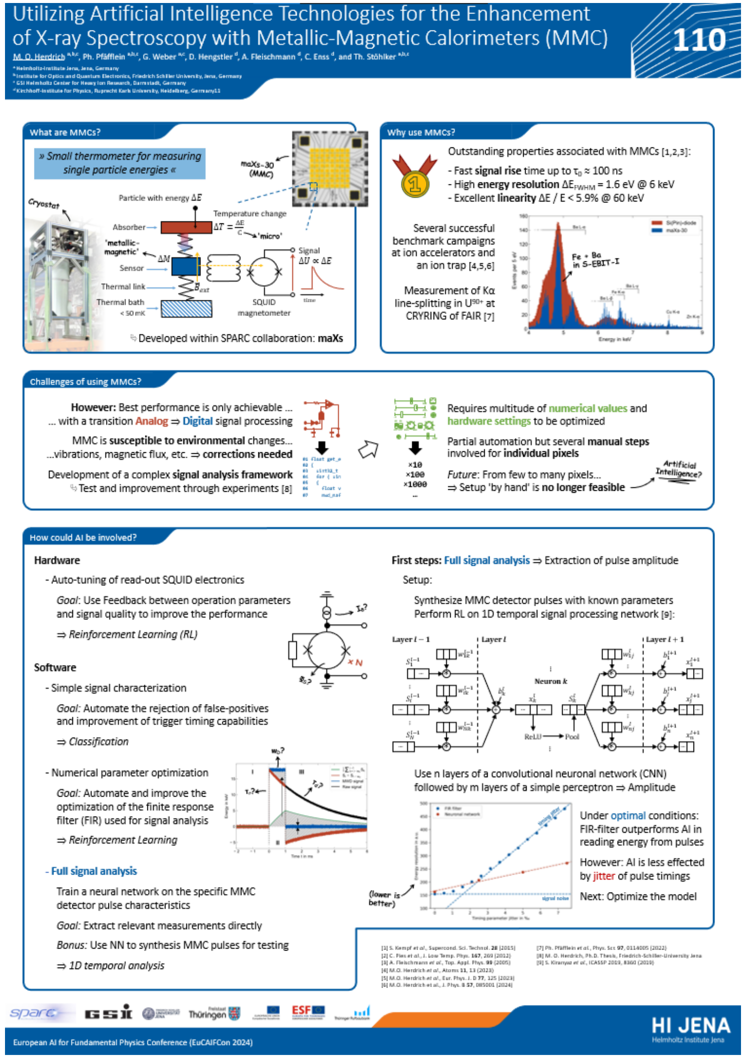

Marc Oliver Herdrich
Helmholtz-Institute Jena

Poster **#110**