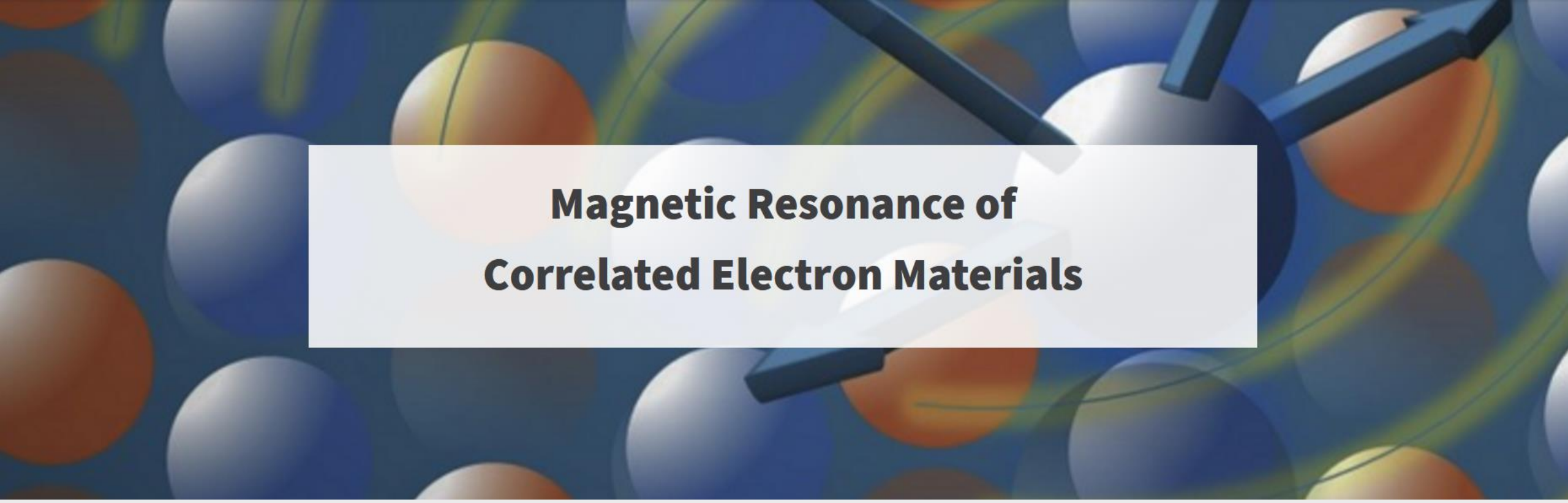


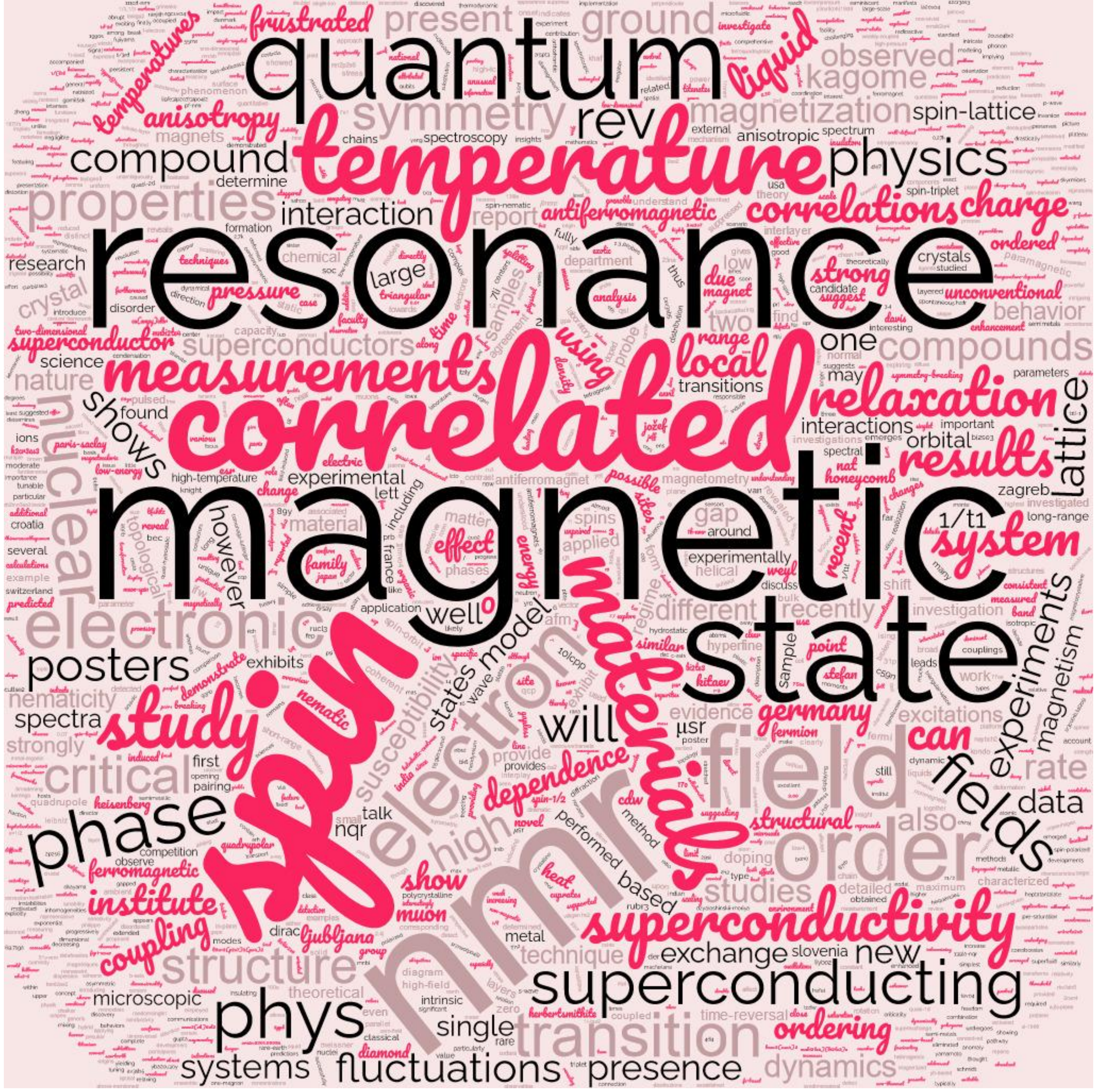
Magnetic Resonance of Correlated Electron Materials

Many thanks to the Organizers:

Miroslav Pozek (Zagreb)

Mihael Grbic (Zagreb)

Hans-Joachim Grafe (Dresden)


magnetic
resonance
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quantum
temperature
materials
field
order
electron
superconducting
measurements
phase
phys
electronic
nuclear
transition
structure
superconductivity
relaxation
fields
lattice
compound
physics
properties
symmetry
correlations
results
system
study
posters
critical
fluctuations
systems
presence
will
compounds
superconductors
experiments
frustrated
liquid
kagome
ground
present
observed
magnetization
anisotropy
temperatures
rev
charge
interaction
local
strong
exchange
new
data
rate
susceptibility
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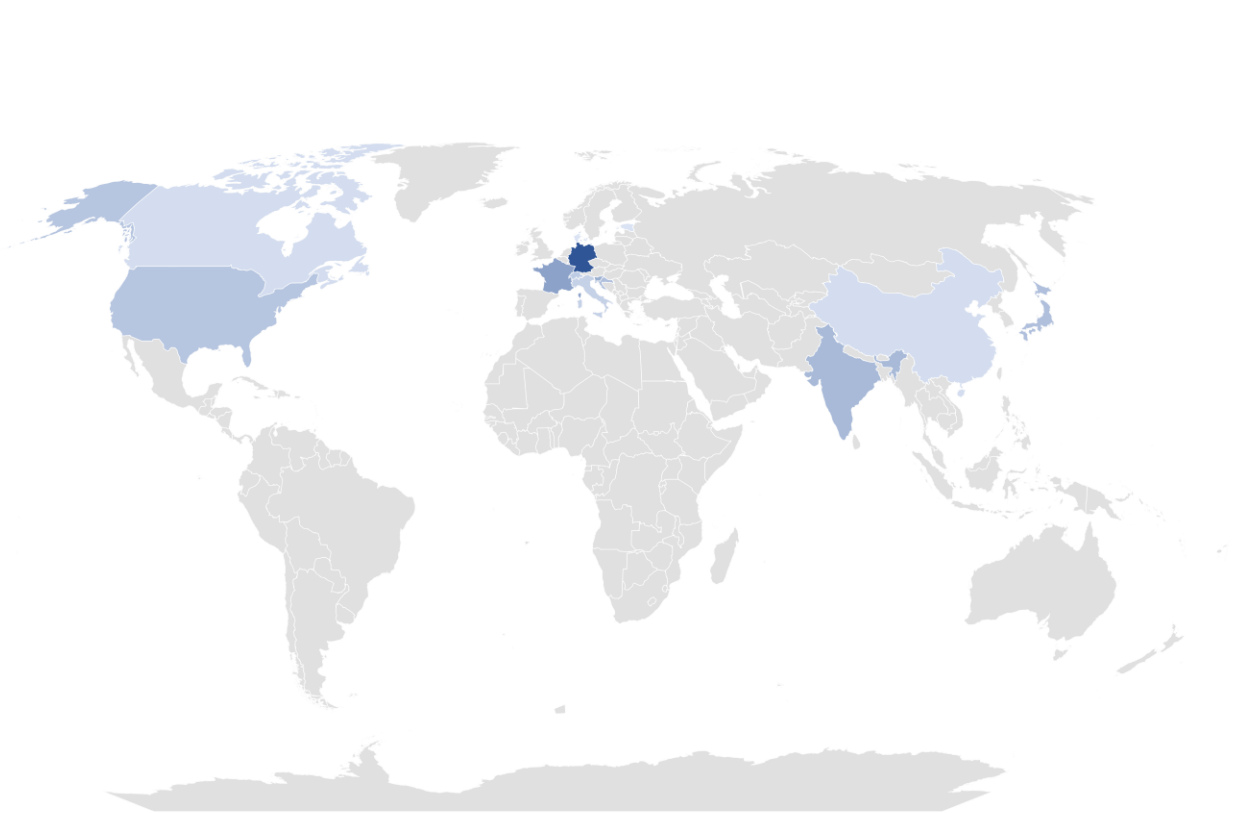
Participant Map



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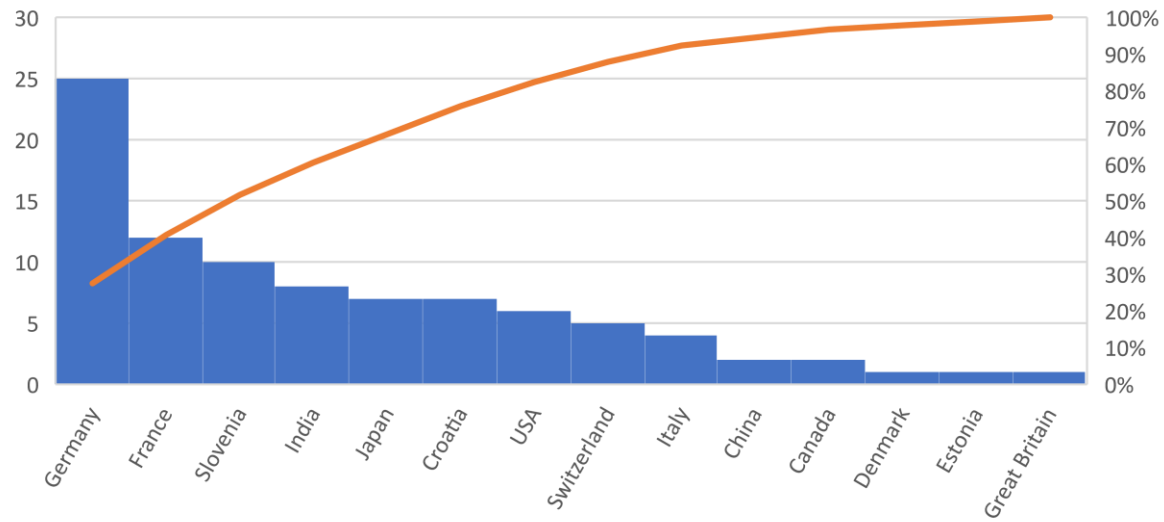
Countries Represented



Materials

Spin liquids
- Kagome (Zn Barlowite, Herbertsmithite)
- distorted Kagome (Kapellasite)
- Kitaev systems (RuCl3, BaCo2(AsO4)2 and (H,Li)6Ru2O6)
- Triangular lattice with rare earths
- Classical spin liquid system
- Delafossites
- Honeycomb systems
- Random lattice

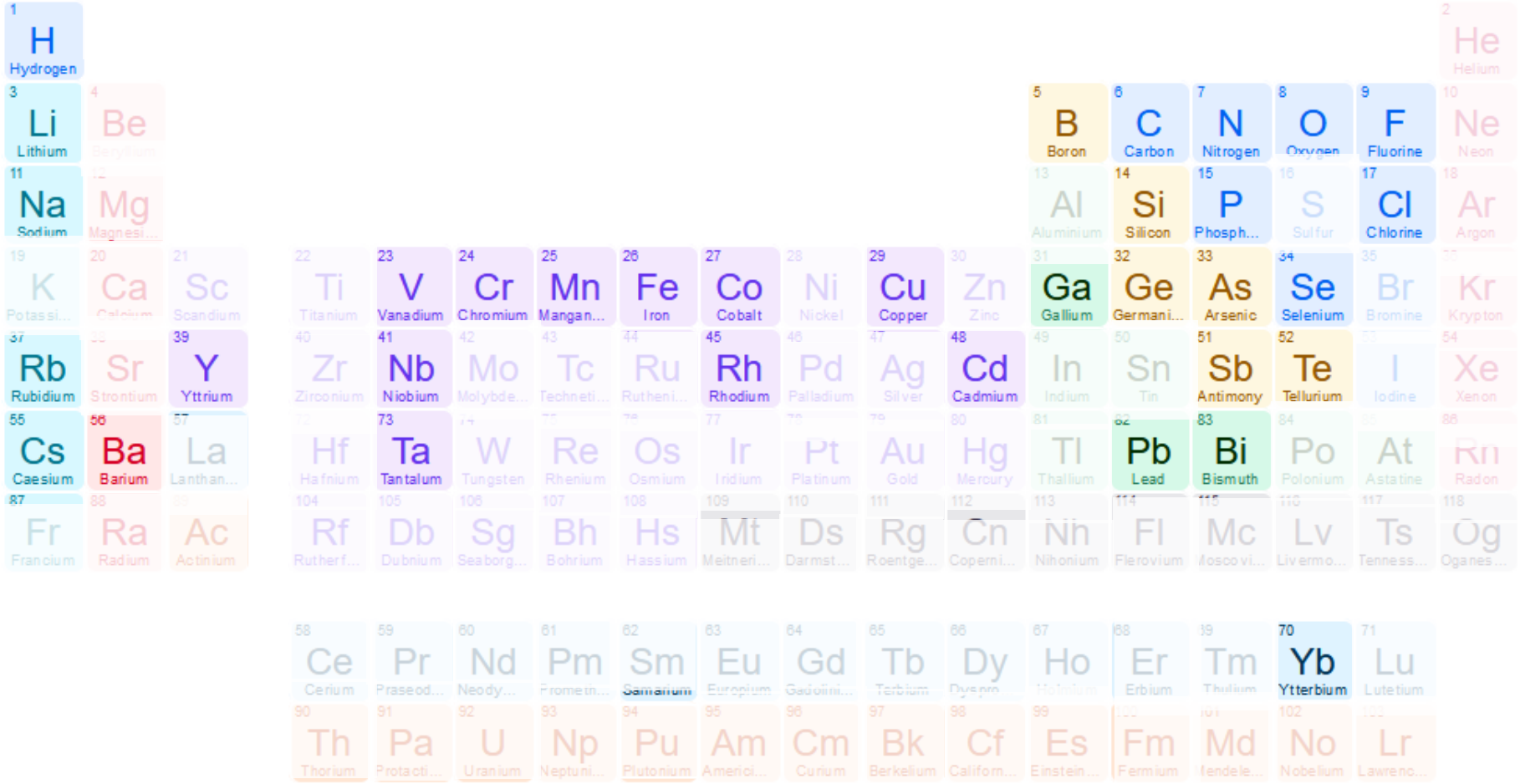
Superconductors
- High Tc cuprates
- Iron-based (AFe2As2,FeSe)
- Uranium (UTe2, URhCo)
- Nickelates
- Bismuthates
- Quasi-1D (ACr3As3, AMo3As3)

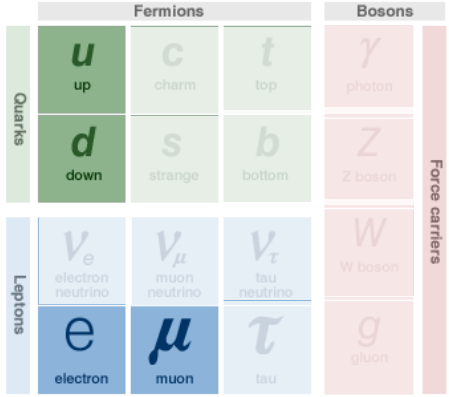
Topological materials
- Weyl semimetals (TaP, TaAs, CuTlSe2,)
- Kagome metals (AV3Sb5)

Low dimensional and/or frustrated magnets
- BKT transition in CuPOF
- Organic conductors
- 2D BEC system (SrZnVO(PO4)2)
- Sawtooth chain structure (atacamite)
- 1D spin chain (BoNO)
- Frustrated chain (Beta-TeVO4)

Minerals
- Atacamite
- Jarosite
- Herbertsmithite
- Diamond
- Moissonite
- Zn-Barlowite

Isotopes


1 H Hydrogen
2 He Helium
3 Li Lithium
4 Be
5 B Boron
6 C Carbon
7 N Nitrogen
8 O
9 F Fluorine
10 Ne Neon
11 Na Sodium
12 Mg
13 Al Aluminium
14 Si Silicon
15 P
16 S Sulfur
17 Cl Chlorine
18 Ar Argon
19 K
20 Ca
21 Sc Scandium
22 Ti Titanium
23 V Vanadium
24 Cr Chromium
25 Mn
26 Fe Iron
27 Co Cobalt
28 Ni Nickel
29 Cu Copper
30 Zn Zinc
31 Ga Gallium
32 Ge
33 As Arsenic
34 Se Selenium
35 Br Bromine
36 Kr Krypton
37 Rb Rubidium
38 Sr Strontium
39 Y Yttrium
40 Zr Zirconium
41 Nb Niobium
42 Mo
43 Tc
44 Ru
45 Rh Rhodium
46 Pd Palladium
47 Ag Silver
48 Cd Cadmium
49 In Indium
50 Sn Tin
51 Sb Antimony
52 Te Tellurium
53 I Iodine
54 Xe Xenon
55 Cs Caesium
56 Ba Barium
57 La
72 Hf Hafnium
73 Ta Tantalum
74 W Tungsten
75 Re Rhenium
76 Os Osmium
77 Ir Iridium
78 Pt Platinum
79 Au Gold
80 Hg Mercury
81 Tl Thallium
82 Pb Lead
83 Bi Bismuth
84 Po Polonium
85 At Astatine
86 Rn Radon
87 Fr Francium
88 Ra Radium
89 Ac
104 Rf
105 Db Dubnium
106 Sg
107 Bh Bohrium
108 Hs Hassium
109 Mt
110 Ds
111 Rg
112 Cn
113 Nh Nihonium
114 Fl Flerovium
115 Mc
116 Lv
117 Ts
118 Og
58 Ce Cerium
59 Pr
60 Nd
61 Pm
62 Sm
63 Eu
64 Gd
65 Tb Terbium
66 Dy
67 Ho
68 Er Erbium
69 Tm
70 Yb Ytterbium
71 Lu Lutetium
90 Th Thorium
91 Pa
92 U Uranium
93 Np
94 Pu Plutonium
95 Am
96 Cm Curium
97 Bk Berkelium
98 Cf
99 Es
100 Fm Fermium
101 Md
102 No Nobelium
103 Lr


Fermions
Bosons
Quarks
Leptons
Force carriers
u up
c charm
t top
γ photon
d down
s strange
b bottom
Z Z boson
ν_e electron neutrino
ν_μ muon neutrino
ν_τ tau neutrino
W W boson
e electron
μ muon
τ tau
g gluon

Novel Approaches

Analysis

- Echo shape analysis, Machine learning
- Inverse Laplace Transform
- Symmetry Group Approach
- Quadrupolar vs Magnetic Relaxation
- DFT + μ

Experimental Techniques

- Self-wrapping microcoils
- NV centers at high pressure
- Beta-NMR
- Pulsed magnetic fields
- Low+High Tc SC magnet
- FIB
- Strain (elastic + plastic deformation)
- Low energy muons
- Coherent electric control
- Improved goniometers

Open Questions

- NMR in topological materials: role of the orbital currents
- Quantum spin liquids: how do our probes couple to the various exotic excitations?
- Superconductivity with multiple components of the order parameter.
- Time-reversal symmetry breaking

Challenges and Opportunities

- Uniaxial Stress Tuning: new phase space, multiple strain symmetries
- Moire materials and VdW heterostructures – NVs, 8Li, low energy muons
- Quantum phase transitions: disentangling intertwined orders
- Sample quality: control of impurities, use of FIB
- Higher order multipoles: symmetry and group theory
- Berry phase physics