Blueferrite.com



Home of Blue Magic!

Content

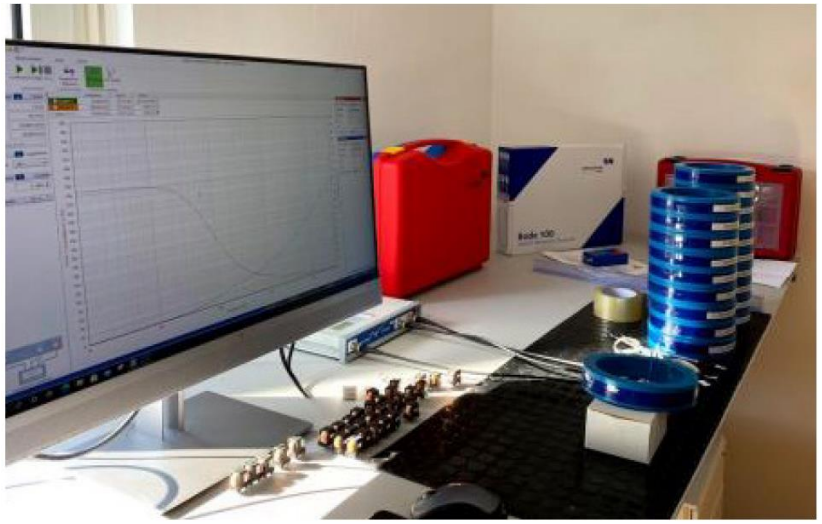
1. Additional Services and Portfolio
2. *Dovitech* GmbH / *Blueferrite*
3. Nanocrystalline Ringcores / chokes

Support with measurements and specific know-how
Laboratory equipment

Impedance Analyzer from Company

OMICRON Lab:

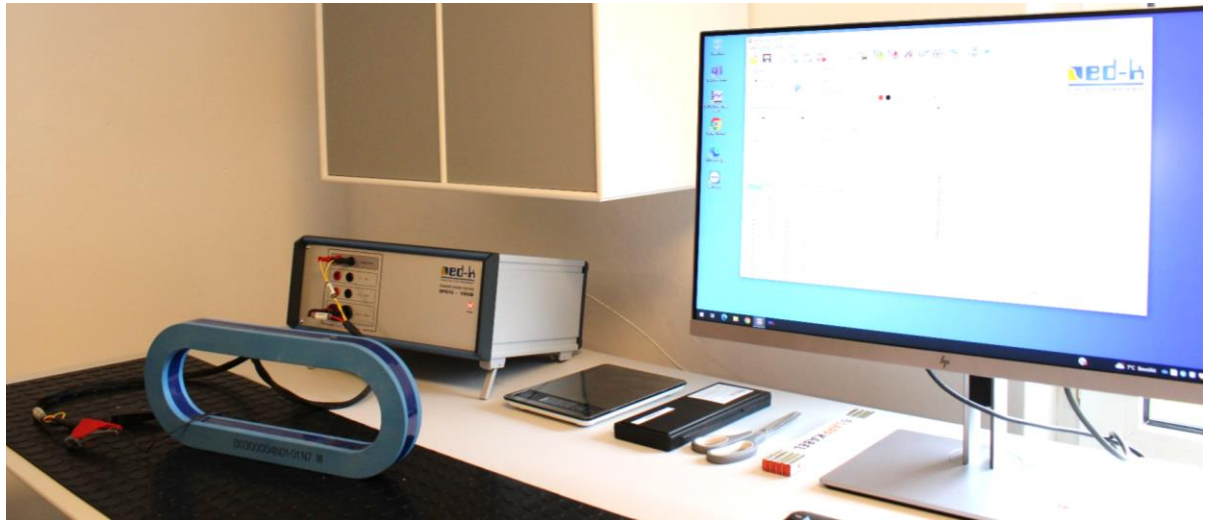
“Vector Network Analyzer - Bode 100”.



Frequency up to 40 MHz.

Power choke tester, DPG10-1000B from Company *ed-k.*

Complete inductance curve as function of current *L*(i) due to pulse measurement method.



Current pulse up to 1000 Ampere.

Consulting off-site and on-site

- Typical rate is 1250€/day for one person (approx. 8 hours) including measurement equipment.
- Results in 6250€/per week.

+ Travel costs:

- Hotel costs customer or approx. 100€/night,
- + 0,70€/km driven car kilometer.

Support possibilities

- Simulation support: LT-Spice models of nanocrystalline cores
- Measurement support on electrical drivetrains for identifying common-mode currents (Rogowski coil)
- Special training and workshops for bearing currents and high frequency effects (Basic and advanced)

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Background: *Dovitech* GmbH / Blueferrite

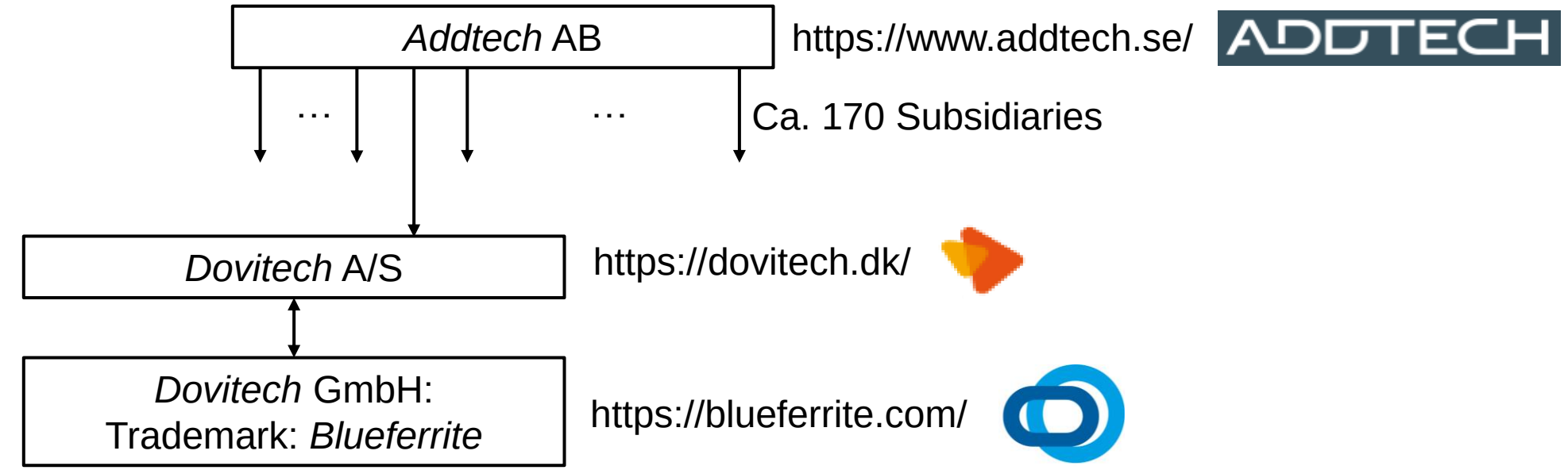
Inspired by decades of passion and experience within the nanocrystalline core-industry, the Blueferrite Brand was established in 2021. Our motivation is to expand the Blueferrite brand to provide the best solutions for solving EMC noise problems on a global scale. By working in close co-operation with our customers, we design, develop, test, and produce customized nanocrystalline cores, which offer effective and sustainable benefits. We also support several Universities in their research to promote sustainability and the progress of the whole industry in general. We have a global presence through selected and dedicated distributors, who are supported by high-end EMC specialists and test-equipment.

Our constantly expanding customer-base are a part of the Wind power, Solar, Electric Vehicles and Chargers, electrical drives and control industries and we are aiming to acquire more customers in various other industries as the Blueferrite-nanocrystalline cores can be used in any industry.



Short introduction: *Dovitech* GmbH / *Blueferrite*

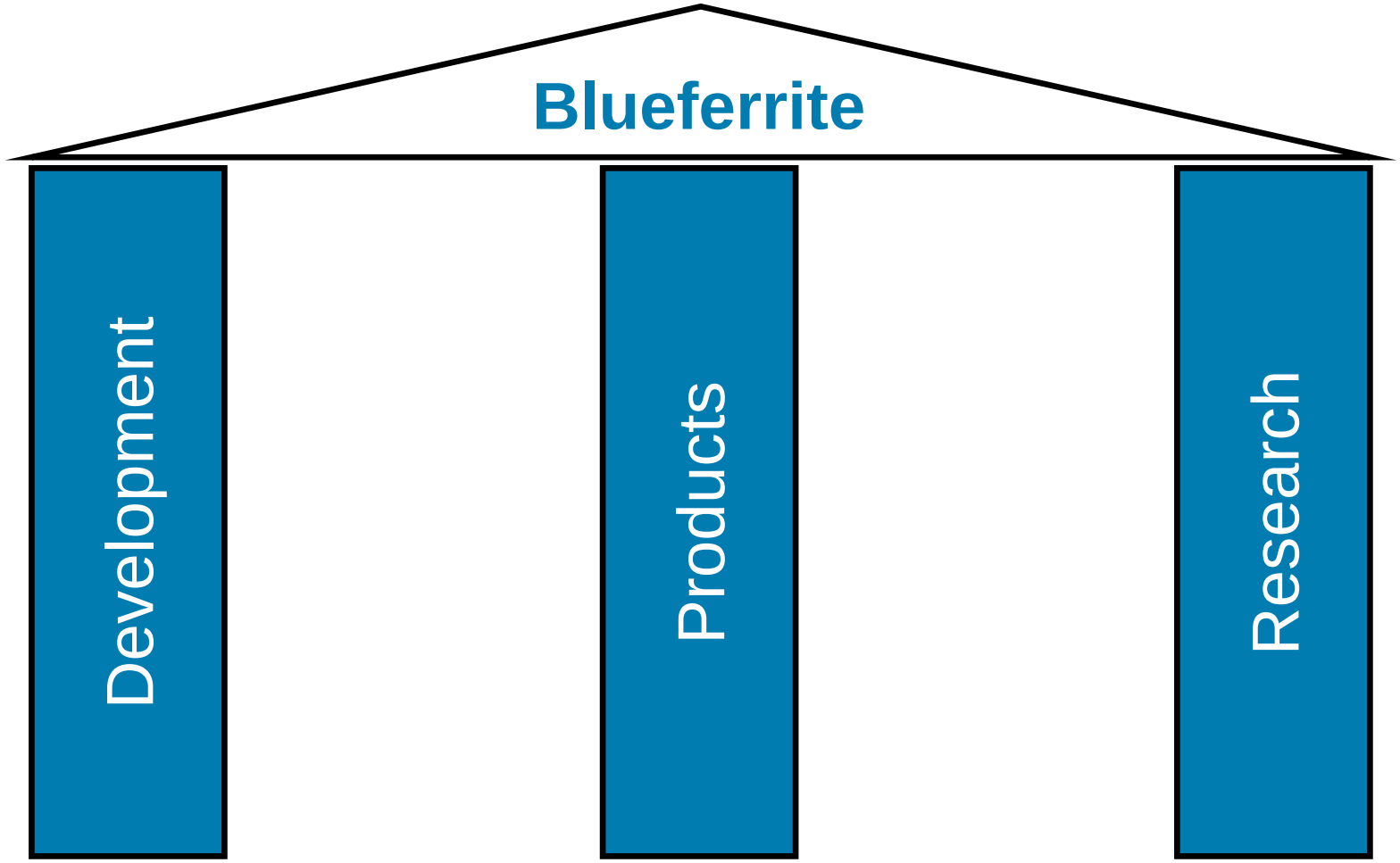
- *Dovitech* GmbH belongs to *Dovitech* A/S (Danish: Aktieselskab, German: Aktiengesellschaft)



Where: Gelnhausen (Nearby Frankfurt a. M.)

Blueferrite: Customized nanocrystalline cores starting from a quantity of 1;
Decades of experience in the nanocrystalline EMC field.

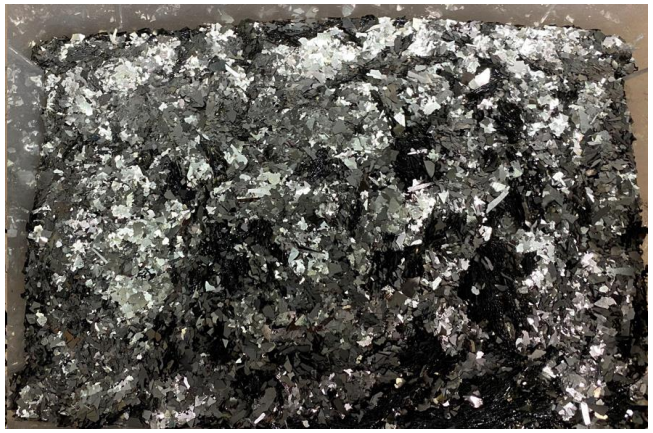
Our 3 pillars:



Research and new products

- Research publication 2023:

  Weicker, M.; Poess, H.-J.: *Reduction of circulating bearing currents in dependence of nanocrystalline common-mode current ring cores*, Proc. of the 25th European Conf. on Power Electronics and Applications (EPE2023 ECCE Europe), 04. - 08.09.2023, Aalborg, Denmark, paper no. 483, 8 pages.



Nanocrystalline „Flakes“ for special applications



Core-holder Kits

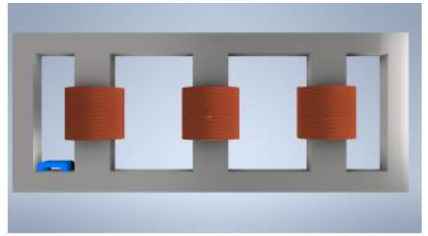
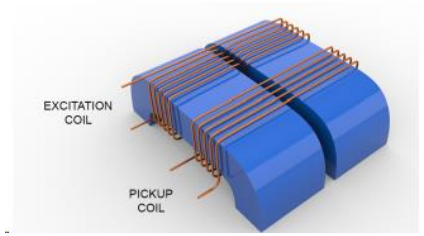


Fig. 1: Schematic of the sensor (in blue) located on the five-limb transformer.



Special sensors

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Blueferrite nanocrystalline standard cores

- Over 89 standard cores from outer diameter 16 mm to 300 mm

Nominal Dimensions	Outer =>	16	20	25	25	30	40	40	45	50
mm	Inner =>	10	12,5	20	16	20	32	25	30	40
	Height =>	6	7,5	10	10	10	15	15	20	20
	Permeability									
	4000	D0016R04	D0020R04	D0025R04	D0025R04	D0030R04	D0040R04	D0040R04	D0045R04	D0050R04
	4000									D0050O04
Saturation Current =>		8	10	14	13	16	23	20	23	28
Peak $\hat{I}_{sat}$ / A	30000	D0016R30	D0020R30	D0025R30	D0025R30	D0030R30	D0040R30	D0040R30	D0045R30	D0050R30
	30000									D0050O30
Saturation Current =>		1	1	2	2	2	3	3	3	4
Peak $\hat{I}_{sat}$ / A	60000	D0016R60	D0020R60	D0025R60	D0025R60	D0030R60	D0040R60	D0040R60	D0045R60	D0050R60
	60000									D0050O60
Saturation Current =>		0,5	0,7	0,9	0,9	1	1,5	1,4	1,6	1,9
Peak $\hat{I}_{sat}$ / A										
				Version 02	Version 01		Version 01	Version 02		Version 01

Systematic designation of the core variants, Example: D0160R30N01-01

Outer diameter in mm

R = Rund
O = Oval

Relative permeability multiplied by factor 1000.

Blueferrite nanocrystalline standard cores

Nominal Dimensions	Outer =>	50	63	80	100	130	160	200	236	300
mm	Inner =>	40	50	63	80	100	130	175	200	250
	Height =>	25	30	30	30	30	30	30	30	30
	Permeability									
	4000	D0050R04	D0063R04	D0080R04	D0100R04	D0130R04	D0160R04	D0200R04		
	4000	D0050O04	D0063O04	D0080O04	D0100O04	D0130O04	D0160O04	D0200O04	D0236O04	D0300O04
Saturation Current =>		28	35	45	56	72	91	117	136	172
Peak $\hat{I}_{sat}$ / A	30000	D0050R30	D0063R30	D0080R30	D0100R30	D0130R30	D0160R30	D0200R30		
	30000	D0050O30	D0063O30	D0080O30	D0100O30	D0130O30	D0160O30	D0200O30	D0236O30	D0300O30
Saturation Current =>		4	5	6	8	10	12	16	18	23
Peak $\hat{I}_{sat}$ / A	60000	D0050R60	D0063R60	D0080R60	D0100R60	D0130R60	D0160R60	D0200R60		
	60000	D0050O60	D0063O60	D0080O60	D0100O60	D0130O60	D0160O60	D0200O60	D0236O60	D0300O60
Saturation Current =>		1,9	2,4	3	3,8	4,8	6	7,8	9,1	11,5
Peak $\hat{I}_{sat}$ / A										
		50	63	80	100	130	160	200	236	300

Systematic designation of the core variants, Example: D0160R30N01-01

Outer diameter in mm

R = Rund
O = Oval

Relative permeability multiplied by factor 1000.

Blueferrite housing possibilities

Impregnated



Epoxy



PA66



Heatshrink



Metal cases



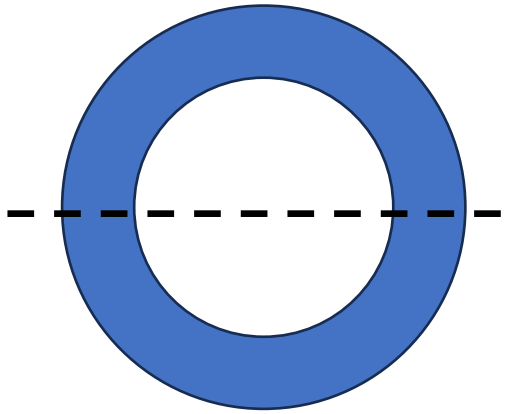
3D printed cases



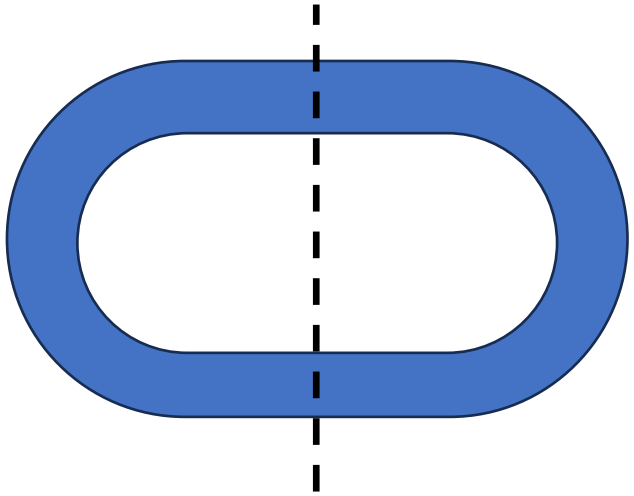
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Possible shapes for nanocrystalline **cut** cores available

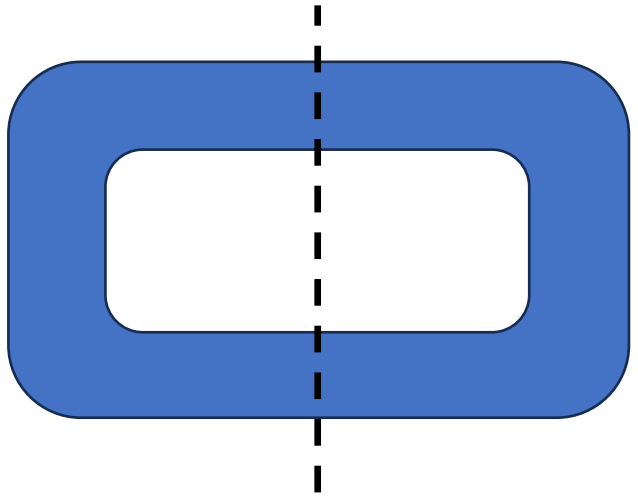
Round core

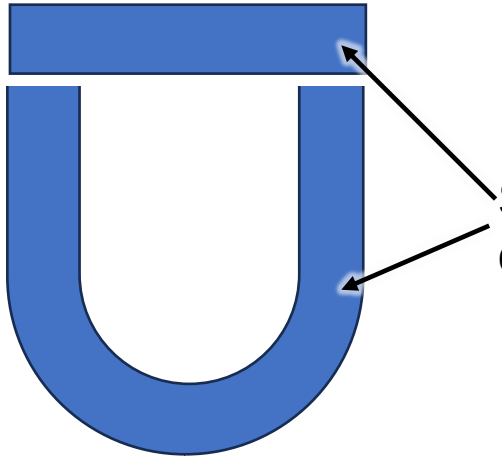


Oval core



Rectangle core





Special shapes with combined parts

Several air gaps can be inserted in the same core to smooth the loss distribution.

Wound nanocrystalline cores, Chokes for

Multi-phase common-mode current chokes for various applications







Magnetic and thermal design of the chokes with in-house calculation program.

EMC-Kits, 2 Versions

EMC-Kit (Standard)



High saturation current, cores up to μ_r = 30000

EMC-Kit Specialized



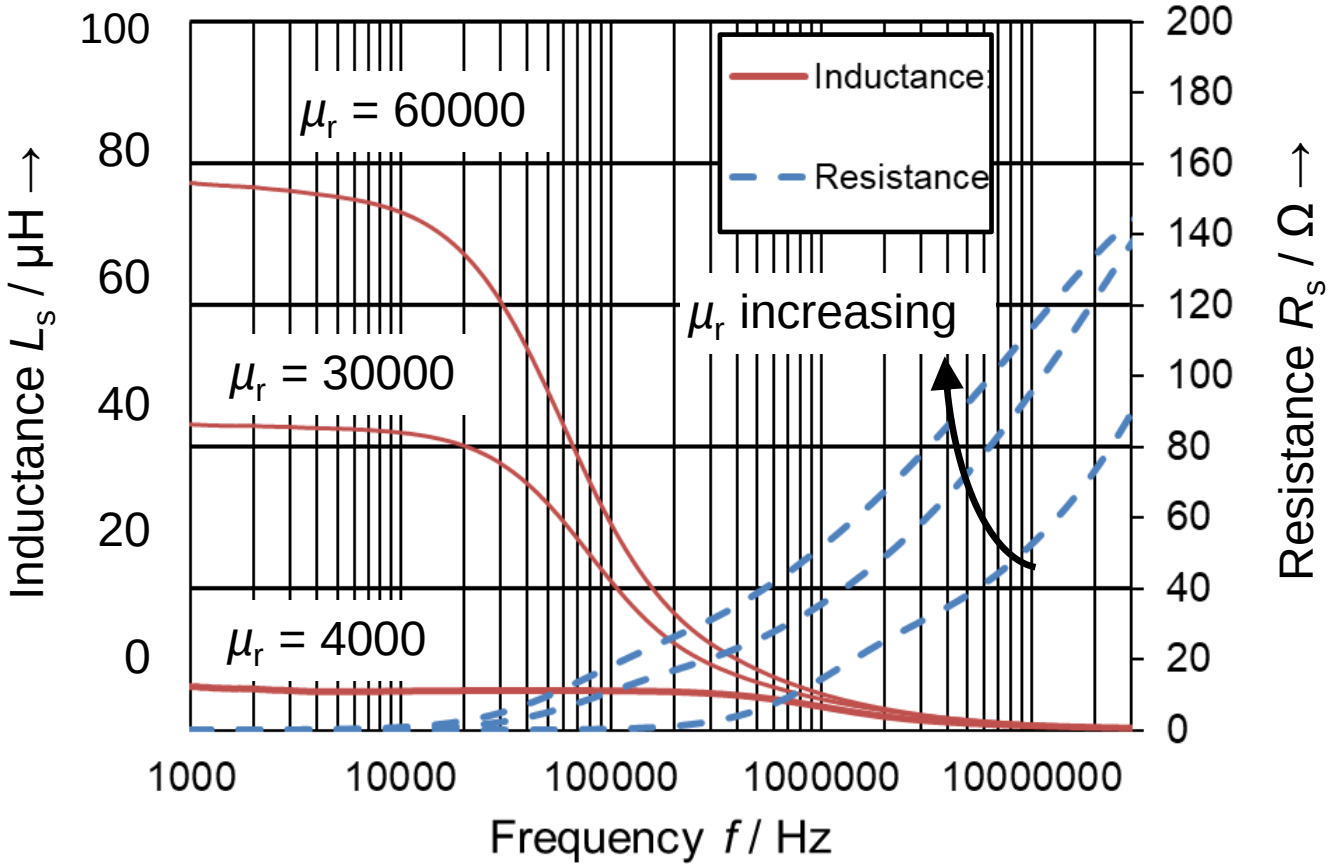
High permeable cores up to μ_r = 90000

Blueferrite nanocrystalline core type D0080R

Measured impedance over frequency with different permeability levels:

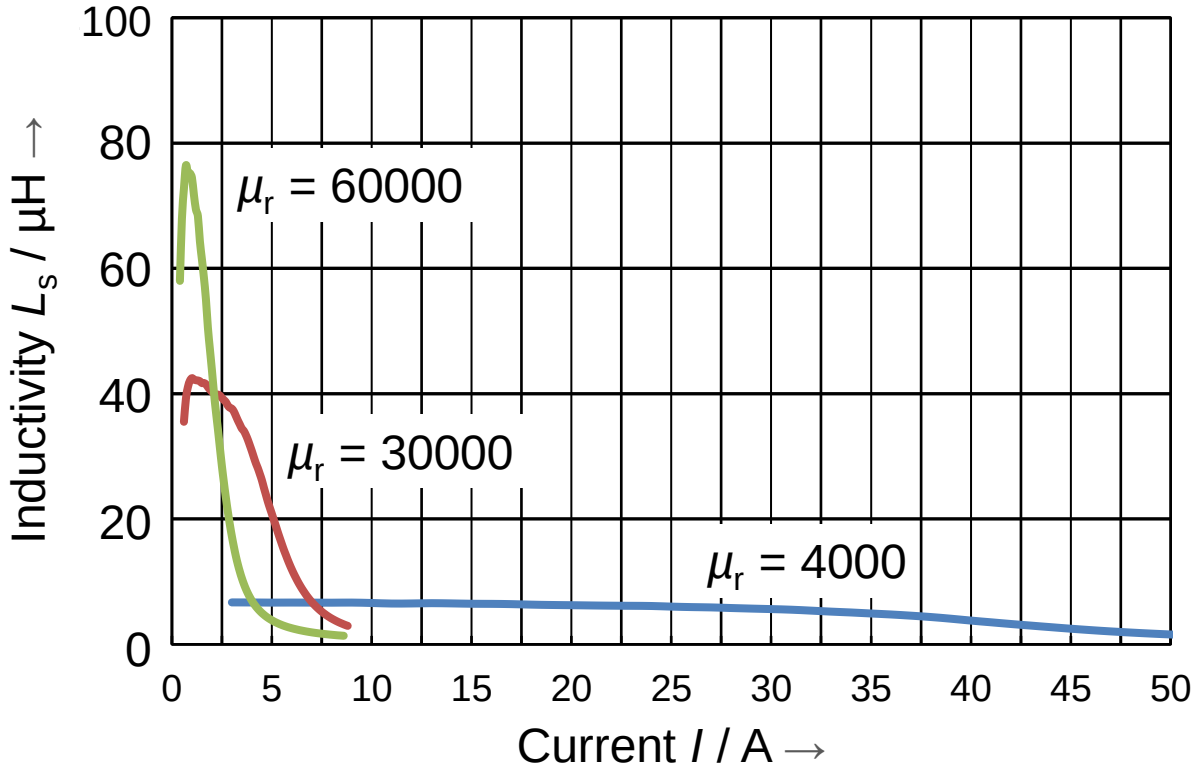
4000; 30000; 60000





Material properties depending on current: $L(I)$

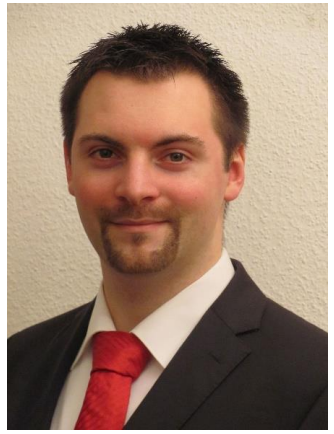
- Measured impedance curve for the Blueferrite nanocrystalline core type D0080R with three different relative permeabilities: 4000; 30000; 60000



$$I_{sat} \sim l_{Fe} \cdot \frac{1}{\mu_r}$$

Conclusion:
The effective **inductance** of a nanocrystalline material depends on the **frequency** and the **current**!

Contacts



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Research topics at Technische Universität Darmstadt
including the field of „Parasitic effects in inverter-fed eletric machines“:

- Inverter-fed bearing currents (measuring, calculation, mitigation techniques, …)
- Travelling wave effects on motor cable
- Nonlinear voltage distribution of the stator winding

Until today over 20 publications on the topic of parasitic effects at inverter-fed drives:
ORCID-iD: https://orcid.org/0000-0002-6080-3417

Thank you for your attention!

Get in touch with us and Experience #BlueMagic