Karlsruhe Institute of Technology

Spiralantennen

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INSTITUT FÜR HOCHFREQUENZTECHNIK UND ELEKTRONIK

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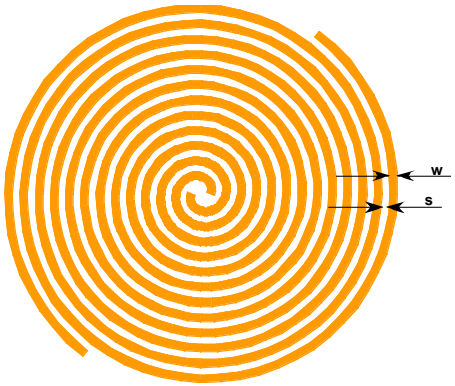
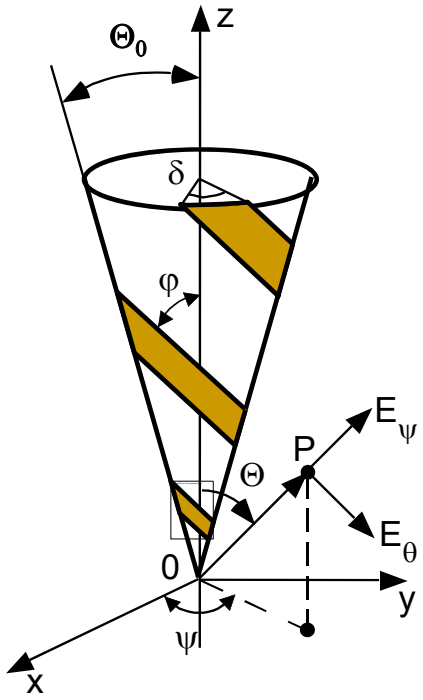
- Archimedische Spiralantennen
- Logaritmische Spiralantennen

Übersicht Spiralantennen



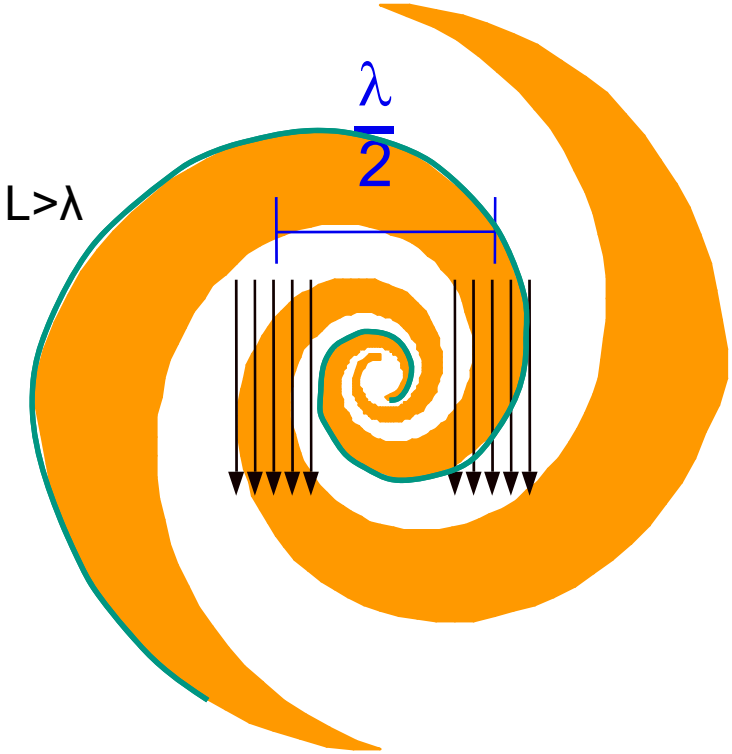
Archimedische Spiralantenne

Logarithmische Spiralantenne

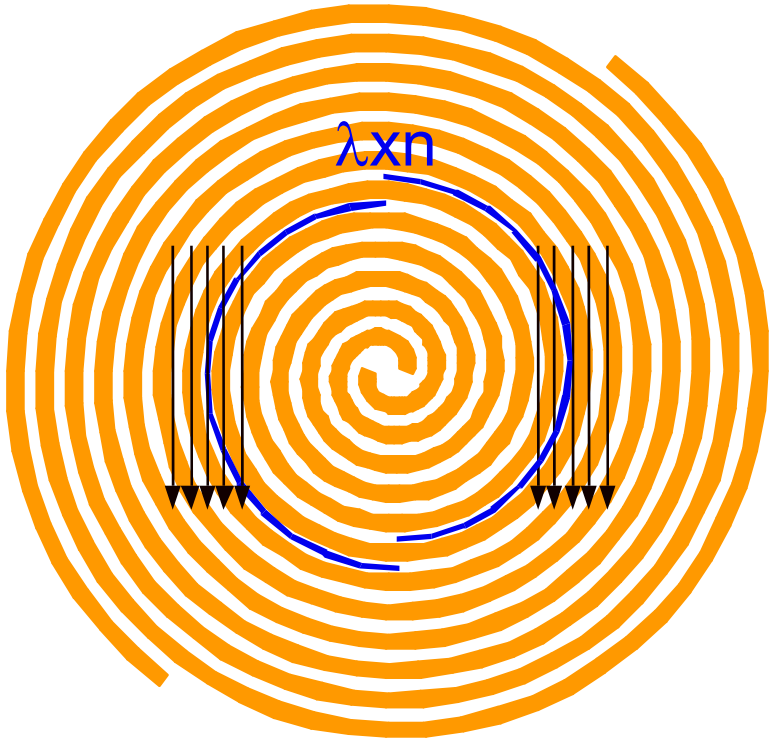


Konische Spiralantenne

Radiation Conditions for Spiral Antennas

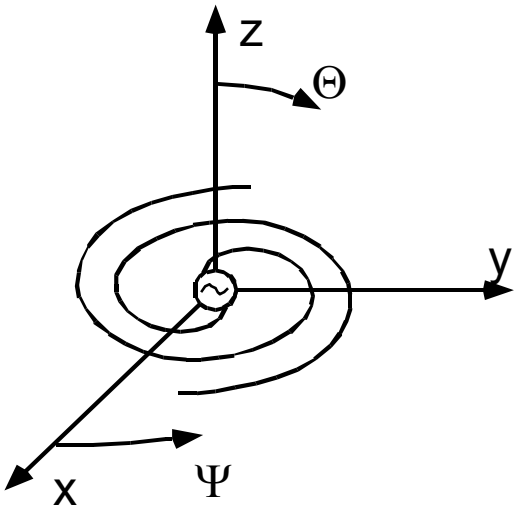


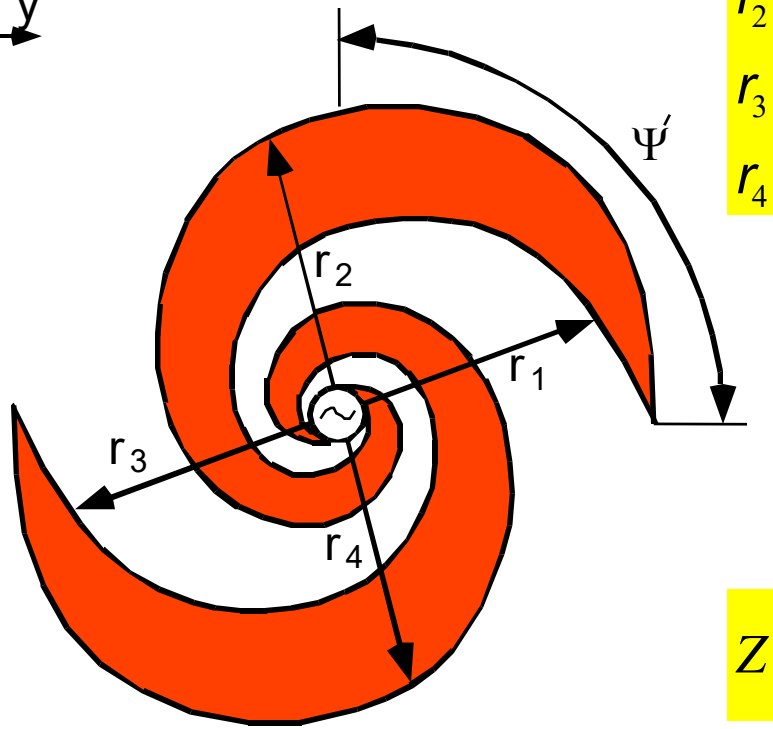
Logarithmische Spiralantenne



Archimedische Spiralantenne

Winkelkonstante ebene Spiral Antenne (Log. Spiral)





Kurven für Berandung:

$$r = r_0 \cdot e^{a\psi} > r_0 = e^{-a\psi_0}$$

$$r_1 = r_0 \cdot e^{a\psi}$$

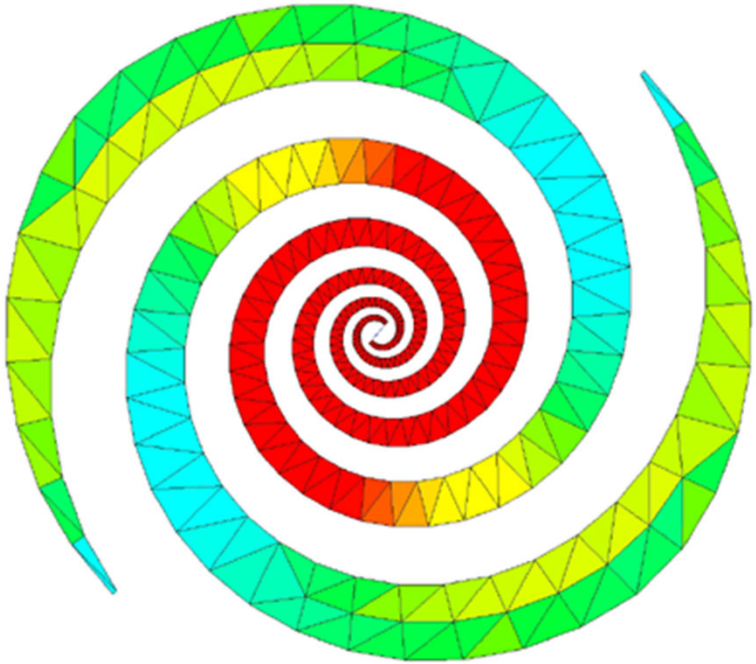
$$r_2 = C \cdot r_1 = r_0 \cdot e^{a(\psi-\psi')}$$

$$r_3 = r_0 \cdot e^{a(\psi-\pi)}$$

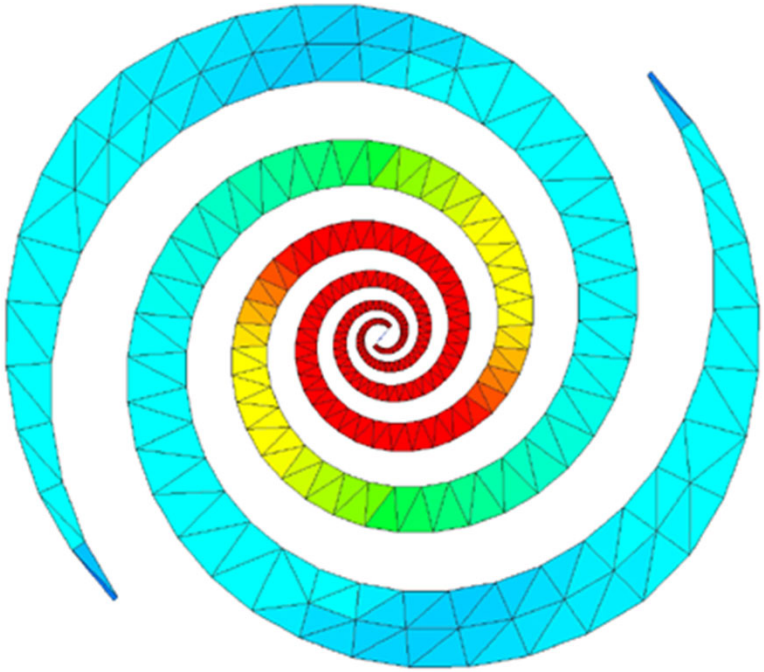
$$r_4 = C \cdot r_3 = r_0 \cdot e^{a(\psi-\pi-\psi')}$$

$$Z \approx \frac{Z_{F0}}{2} = 188\Omega$$

Logarithmic Spiral Antenna
- Current Distribution -

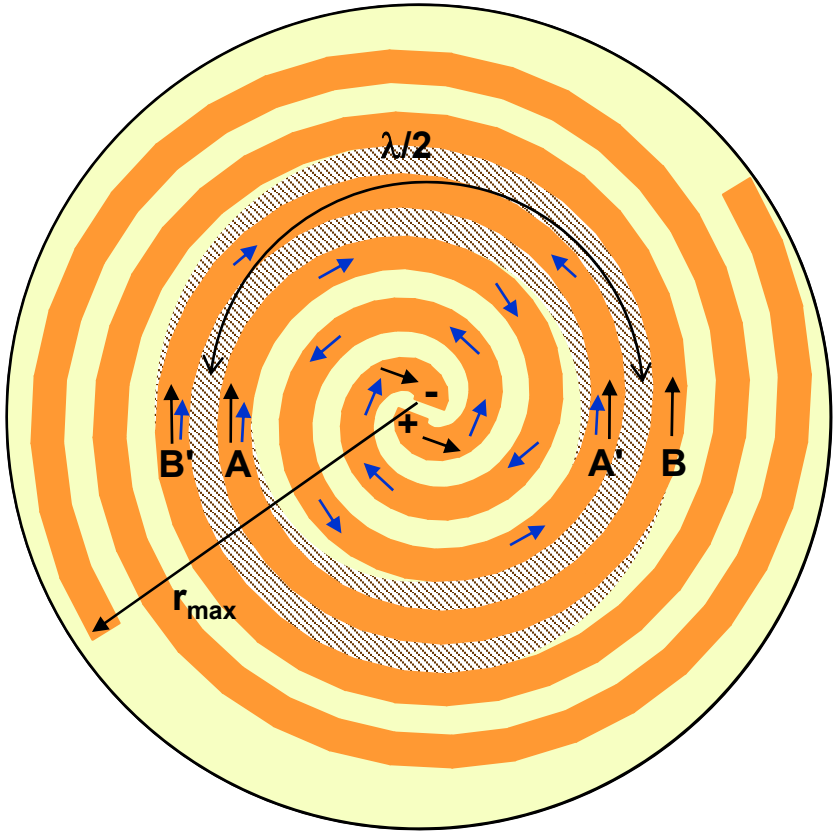


***d* = 40cm, *f* = 300MHz**

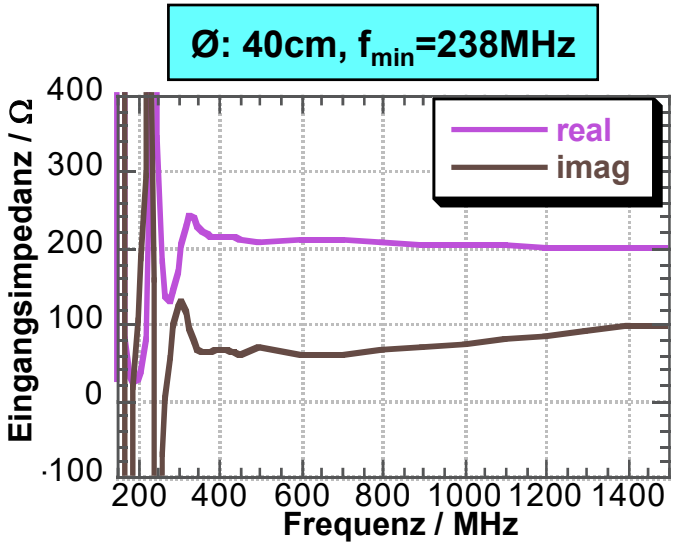


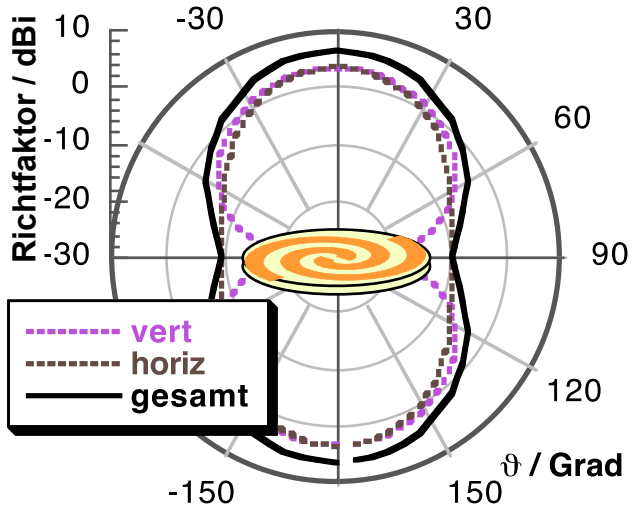
***d* = 40cm, *f* = 450MHz**

Zweiarmspirale

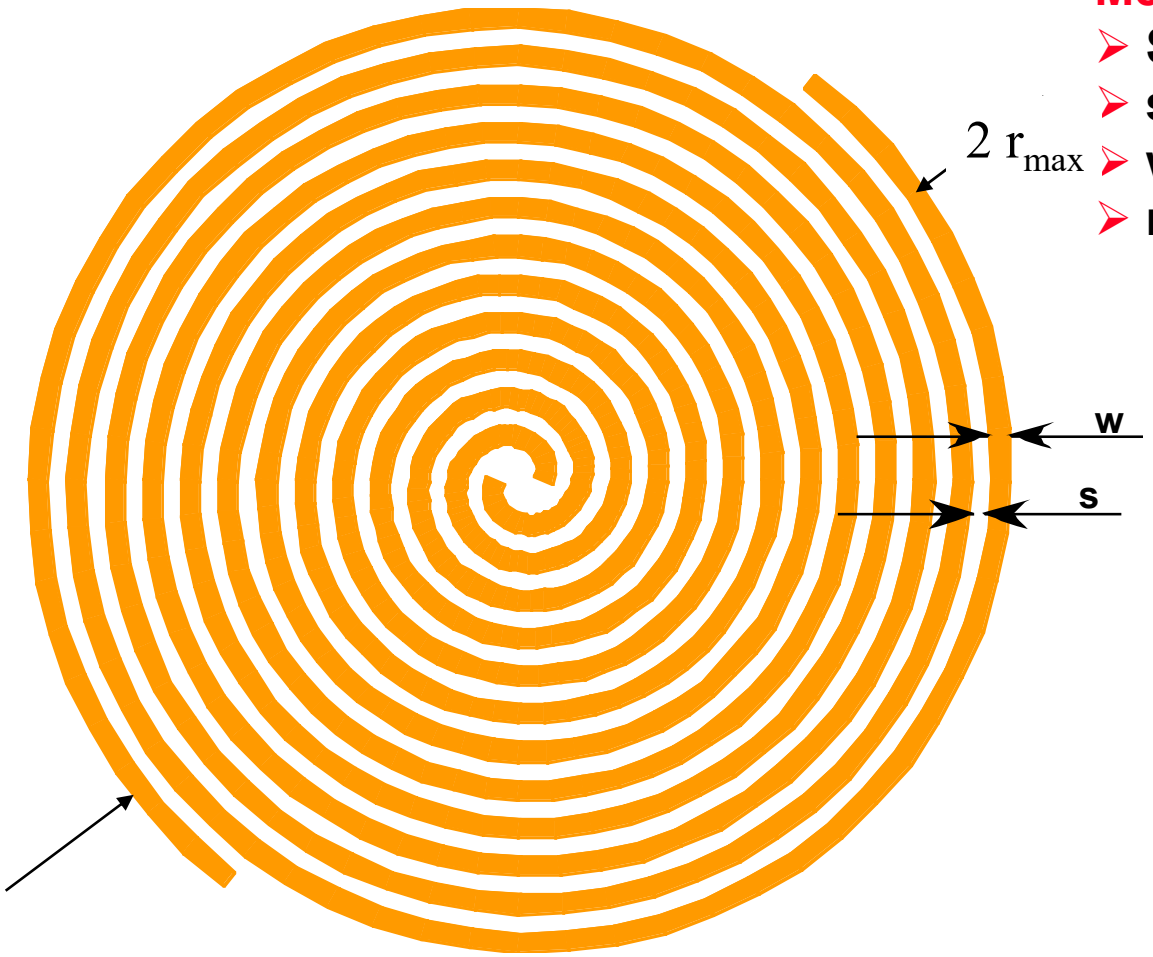


$$f_{min} = \frac{c_0}{2\pi r_{max}\sqrt{\varepsilon_{r,eff}}}$$





Archimedische Spiral Antenne (querschnittskonstant)



Merkmale:

- Symm. Speisung
- s = konstant
- w = konstant
- r = Radius

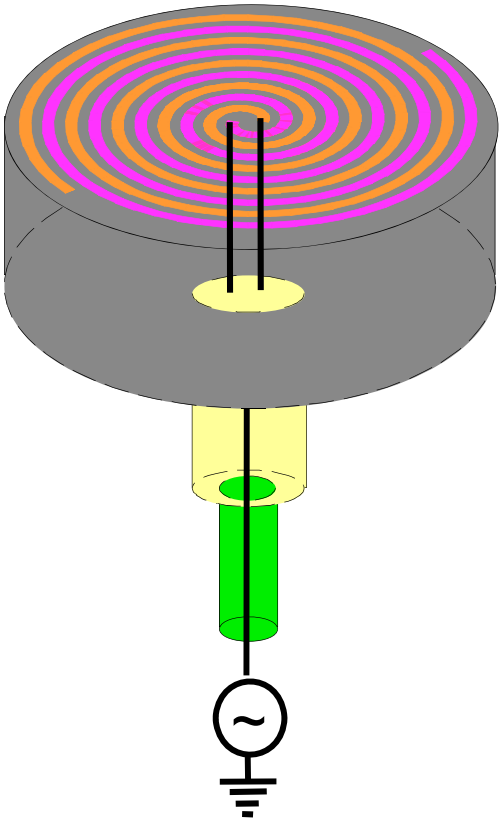
$$Z \approx \frac{Z_{F0}}{2} = 188\Omega$$

$$w \approx s$$

$$f_{max} = \frac{c_0}{2\pi r_{min}\sqrt{\varepsilon_{r,eff}}}$$

$$f_{min} = \frac{c_0}{2\pi r_{max}\sqrt{\varepsilon_{r,eff}}}$$

Spiralantennen Speisung



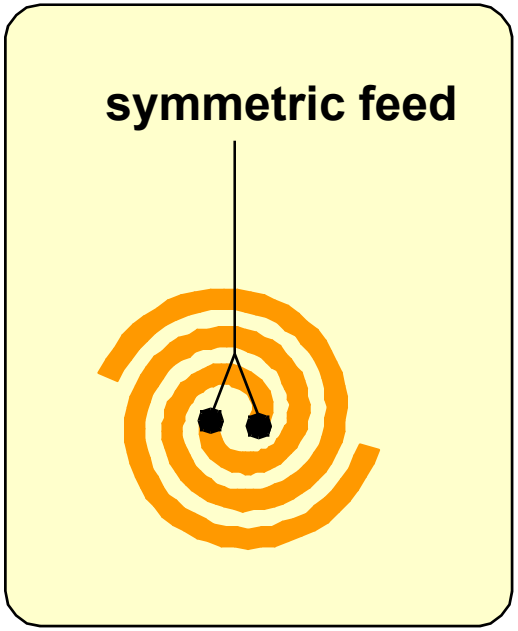
Drahtspirale

Cavity

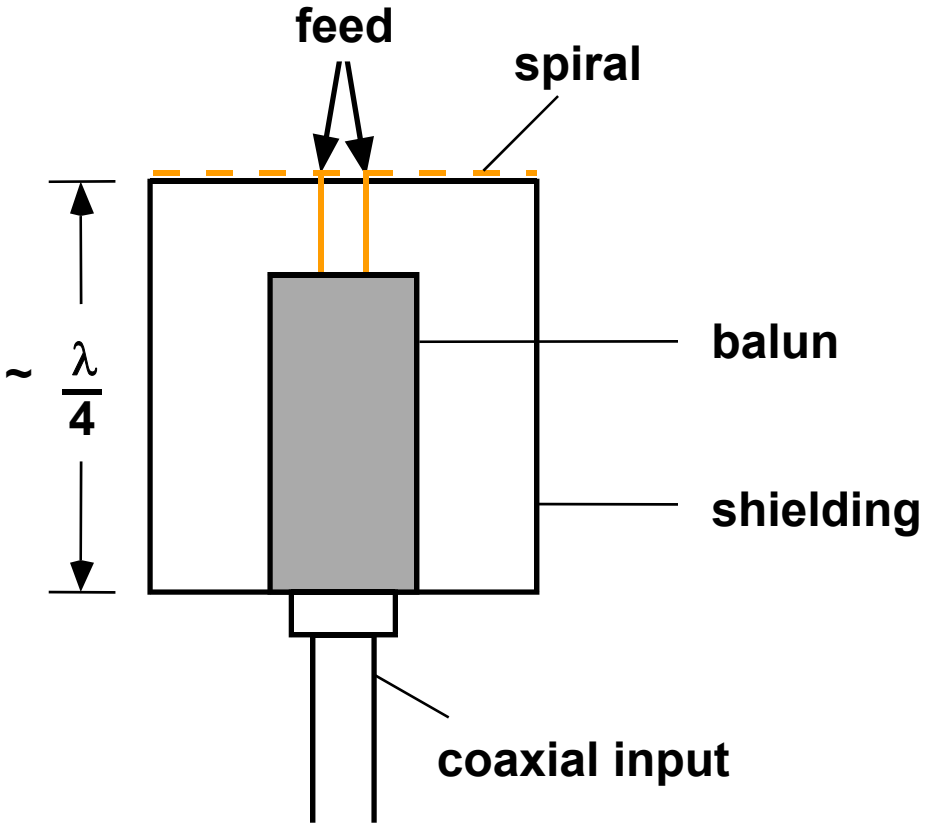
Balun

Koxialleitung

Spiral Antenna Feed Balun

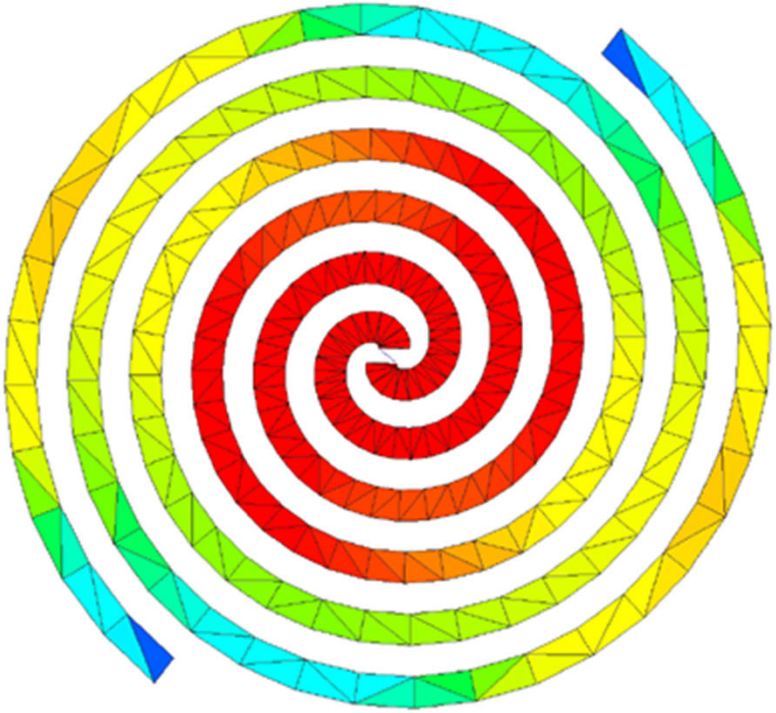


top view



cross section

Archimedian Spiral Antenna
- Current Distribution -

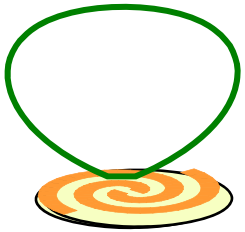


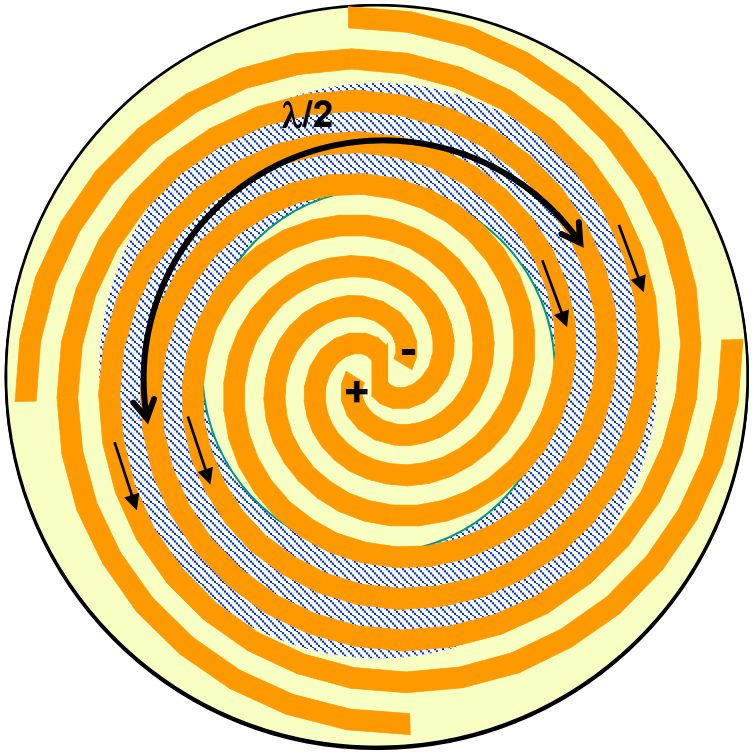
d = 40cm, f = 300MHz

d = 40cm, f = 450MHz

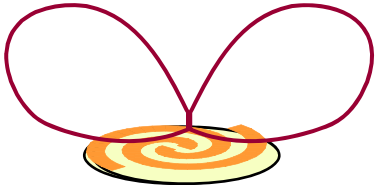
Vierarmspirale mit verschiedenen Moden

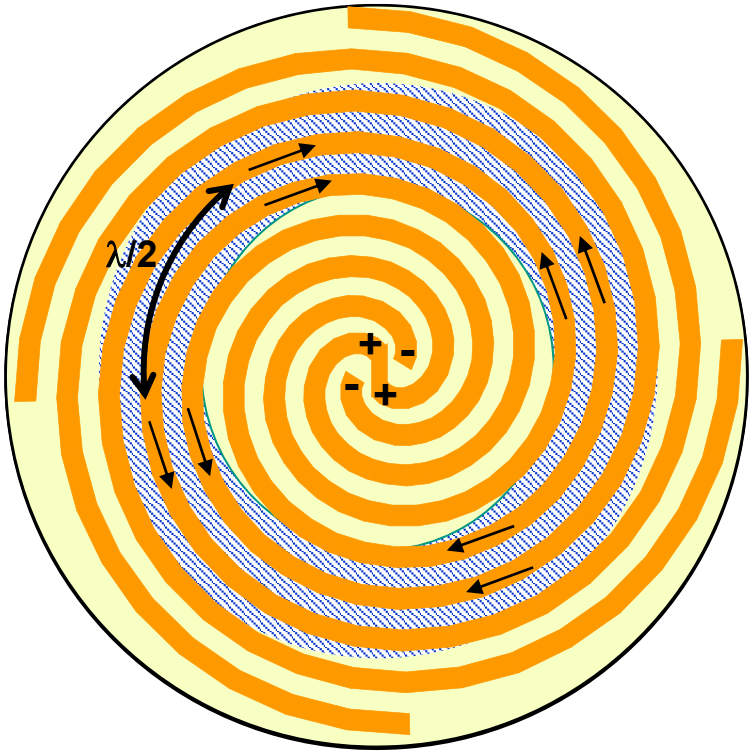
Zirkulare Mode



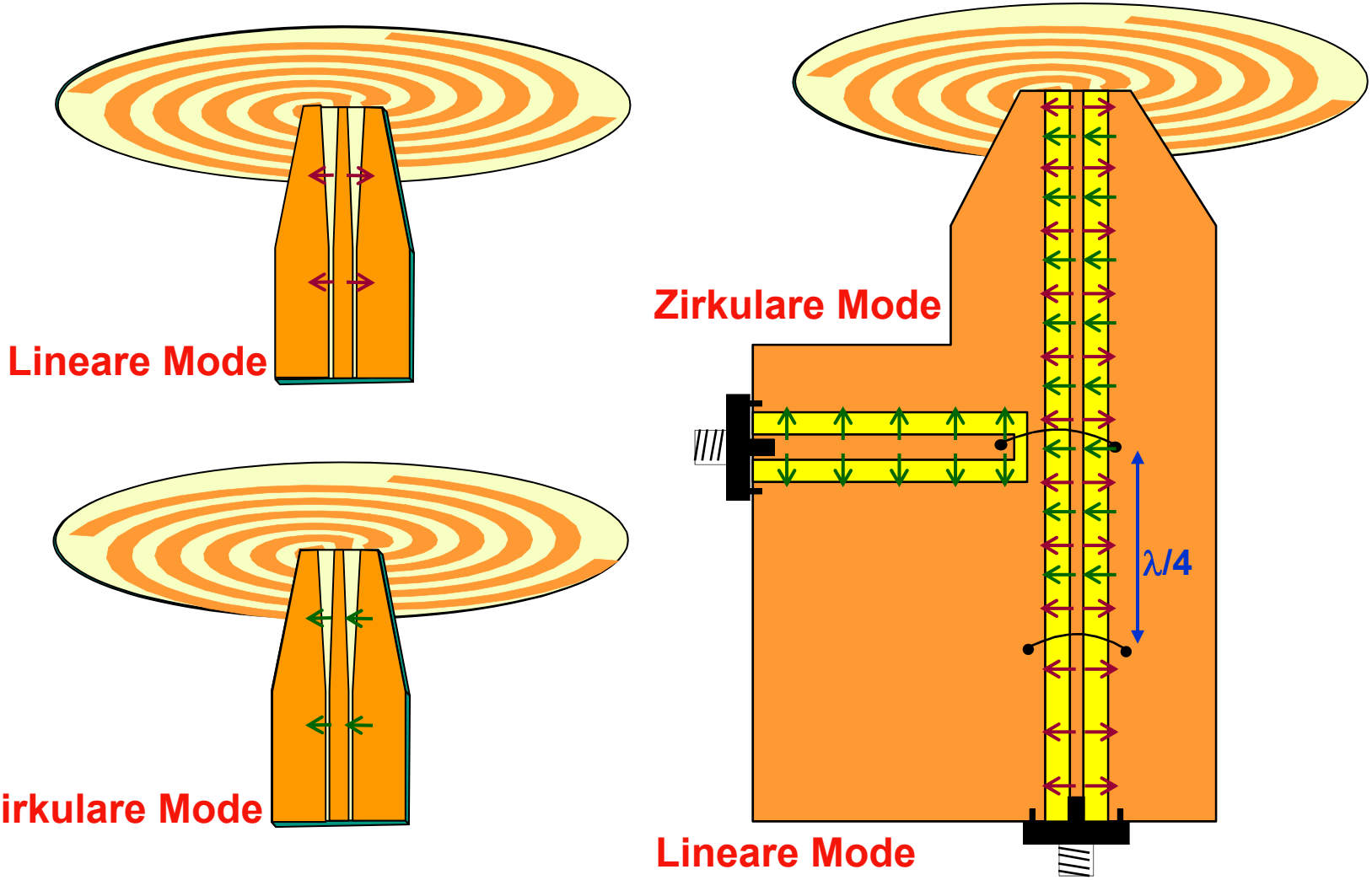


Lineare Mode

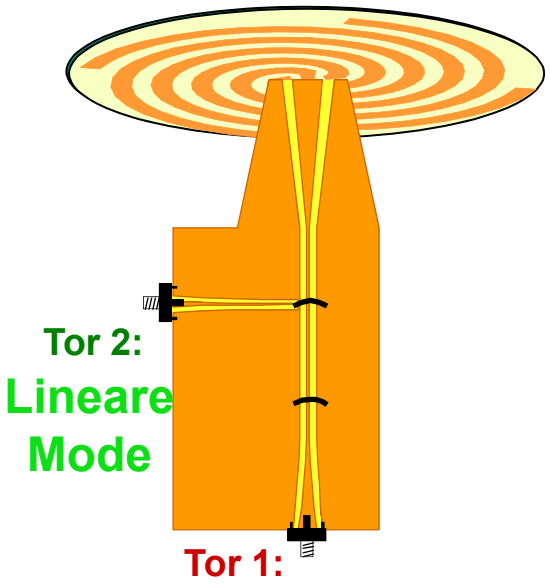




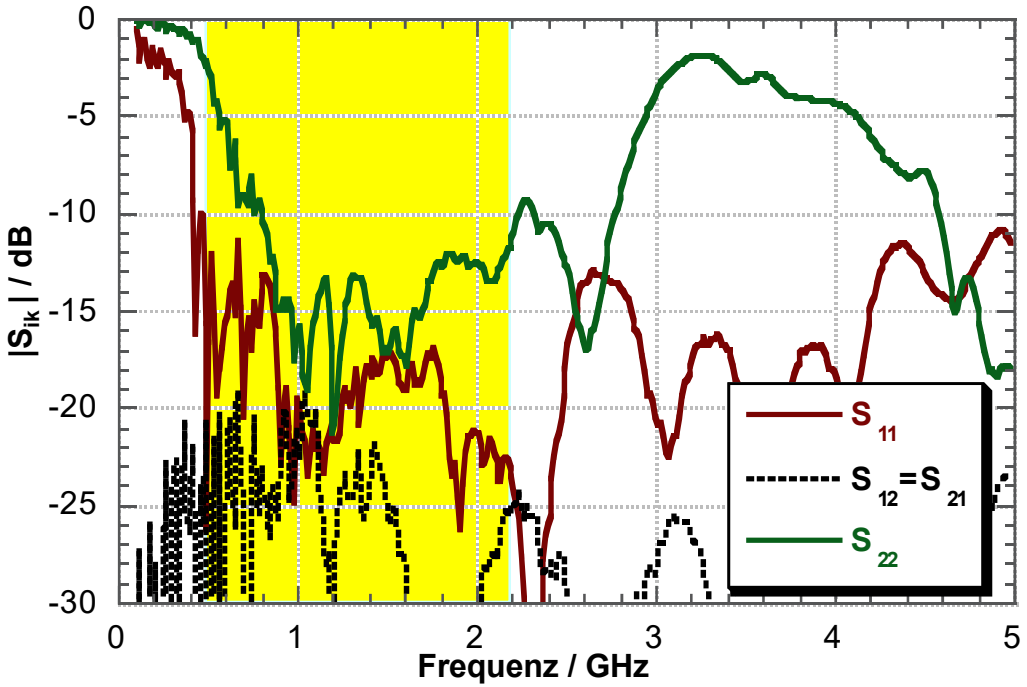
Speisung der Vierarmspirale



Anpassung Speisenetzwerk an Spirale

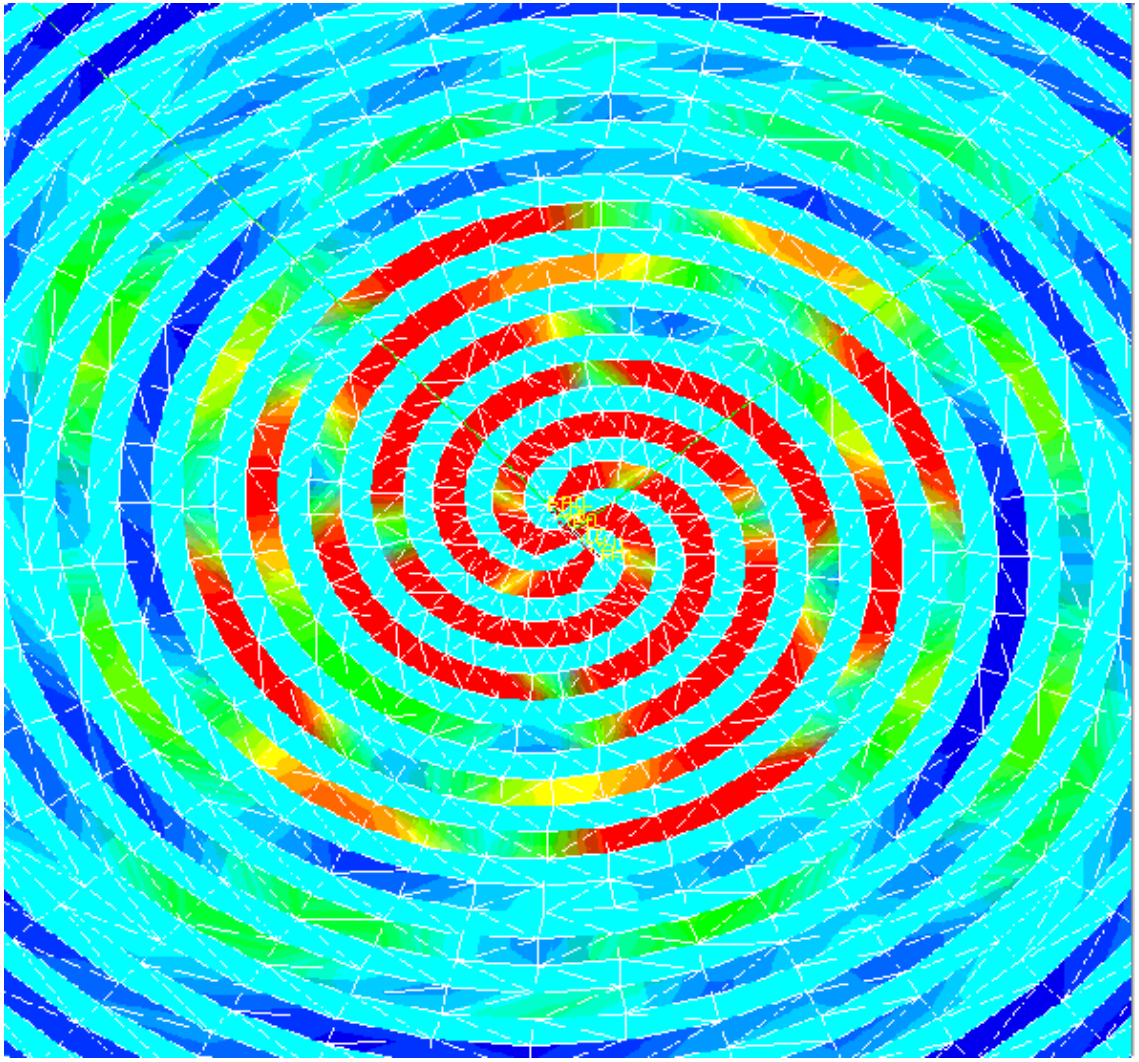


Zirkulare Mode



Ø: 40cm, Spirale auf Kunststoff

Archimedian Spiral Antenna
- Current Distribution -



d **= 40 cm**
f **= 1800 MHz**

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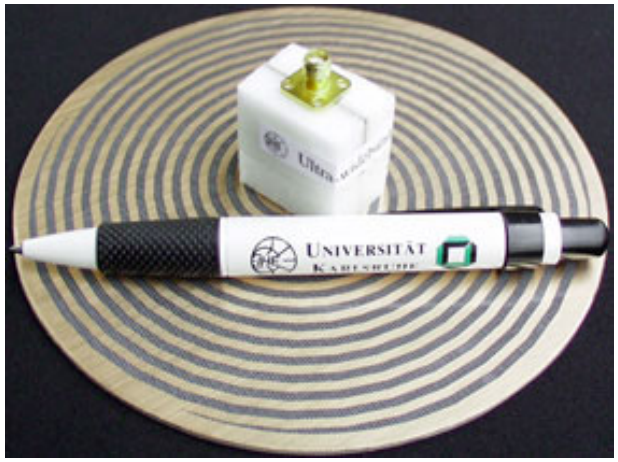
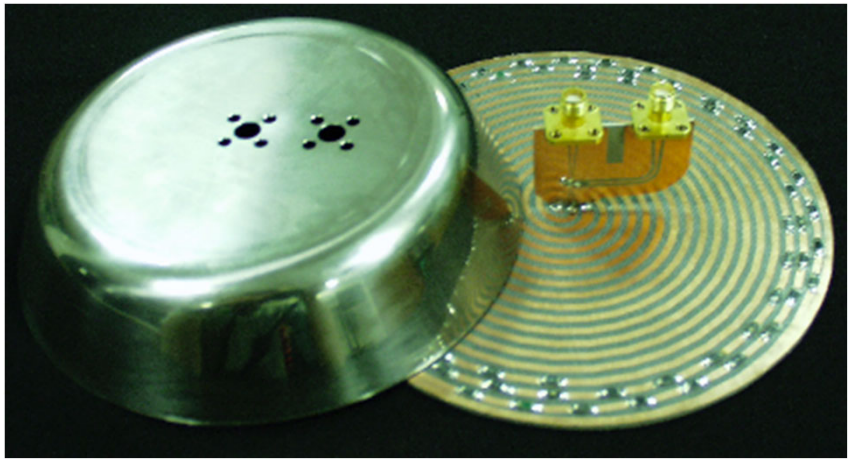
und Elektronik

Baumuster von Spiralantennen

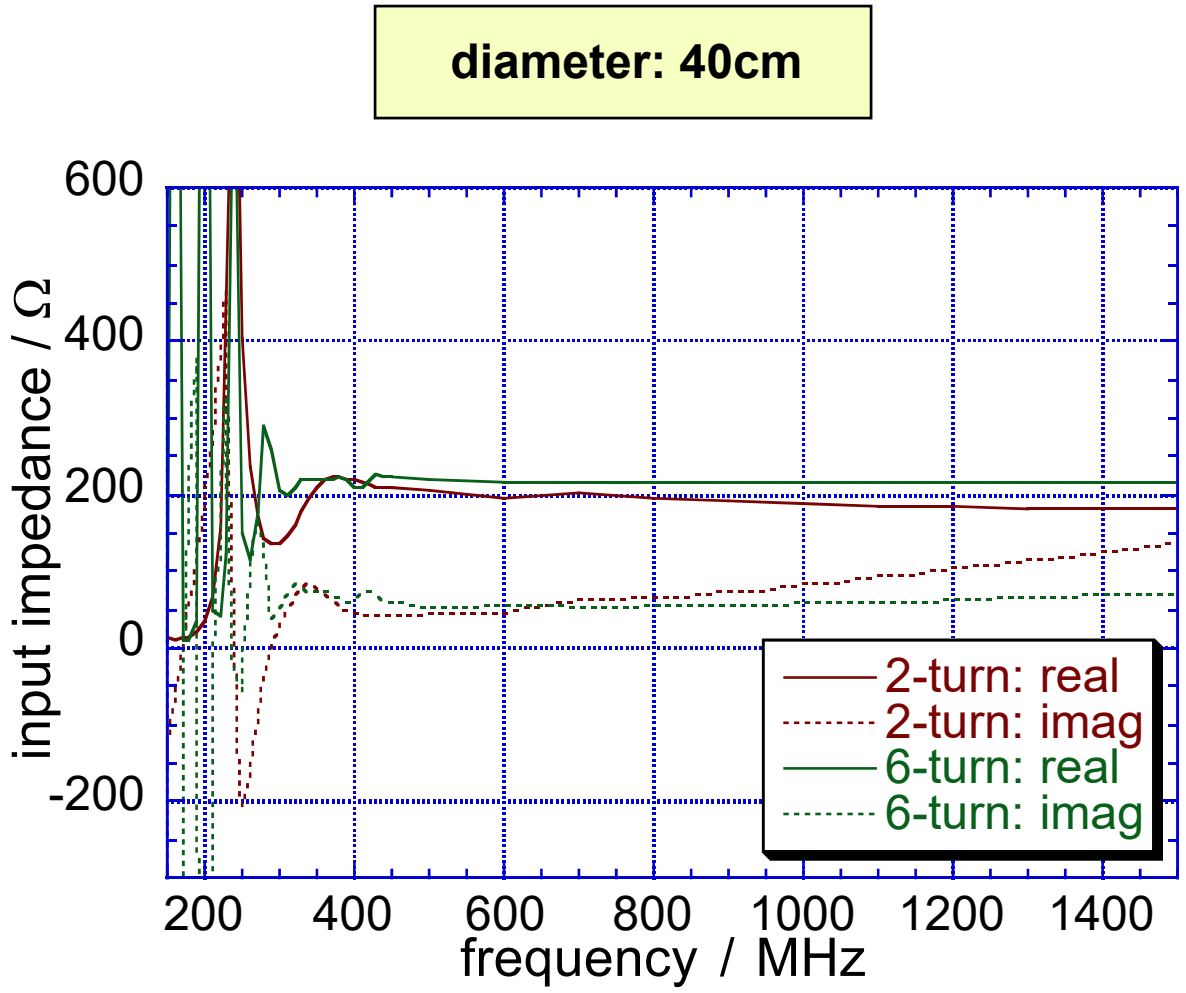


Archimedische Spiralantenne



Dual-Mode Spiralantenne

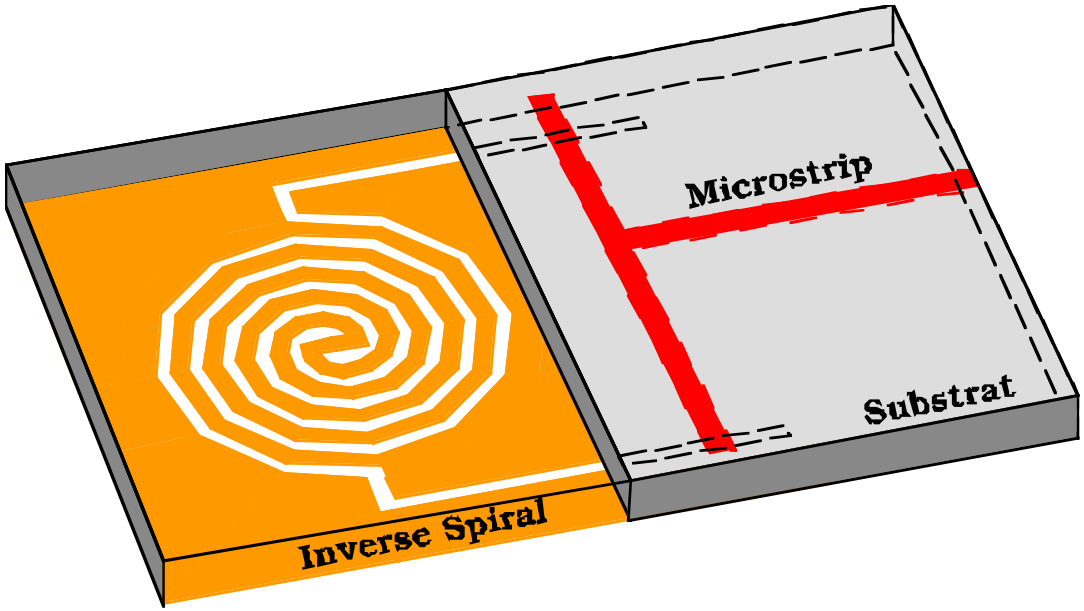
Archimedian Spiral Antenna Input Impedance



Outside Fed Spiral Antennas

Features:

- Flat
- wide band
- simple feed



180°-symmetric feed

two-wire transmission line feed