

Abstract Submitted
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**Kinetic modeling of Active Plasma Resonance Spectroscopy:
Why “Drude” is not enough¹** RALF PETER BRINKMANN, CHUNJIE
WANG, JUNBO GONG, Ruhr University Bochum, MICHAEL FRIEDRICHS,
JENS OBERRATH, Leuphana University Lneburg — The term active plasma
resonance spectroscopy (APRS) denotes a class of related techniques which utilize,
for diagnostic purposes, the natural ability of plasmas to resonate on or near the elec-
tron plasma frequency ω_{pe} : a radio frequent signal (in the GHz range) is coupled into
the plasma via a probe, the spectral response is recorded, and a mathematical model
is used to determine parameters such as the plasma density or the electron temper-
ature. This contribution discusses the importance of choosing the proper physical
theory for that mathematical model. The so-called Drude model (also known as
cold plasma model) provides a relatively simple qualitative description, but is not
suited for a quantitatively correct analysis. The physically superior kinetic theory
is, unfortunately, mathematically more complex. The contribution discusses the dif-
ference between the two approaches and shows how the mathematical problems of
the kinetic description can be overcome.

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