Roberto Tricarico

Tutor: Carlo Forestiere

XXXII Cycle – 1st year presentation

Classical and Quantum Electromagnetic Theory of Nanoparticles

UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II

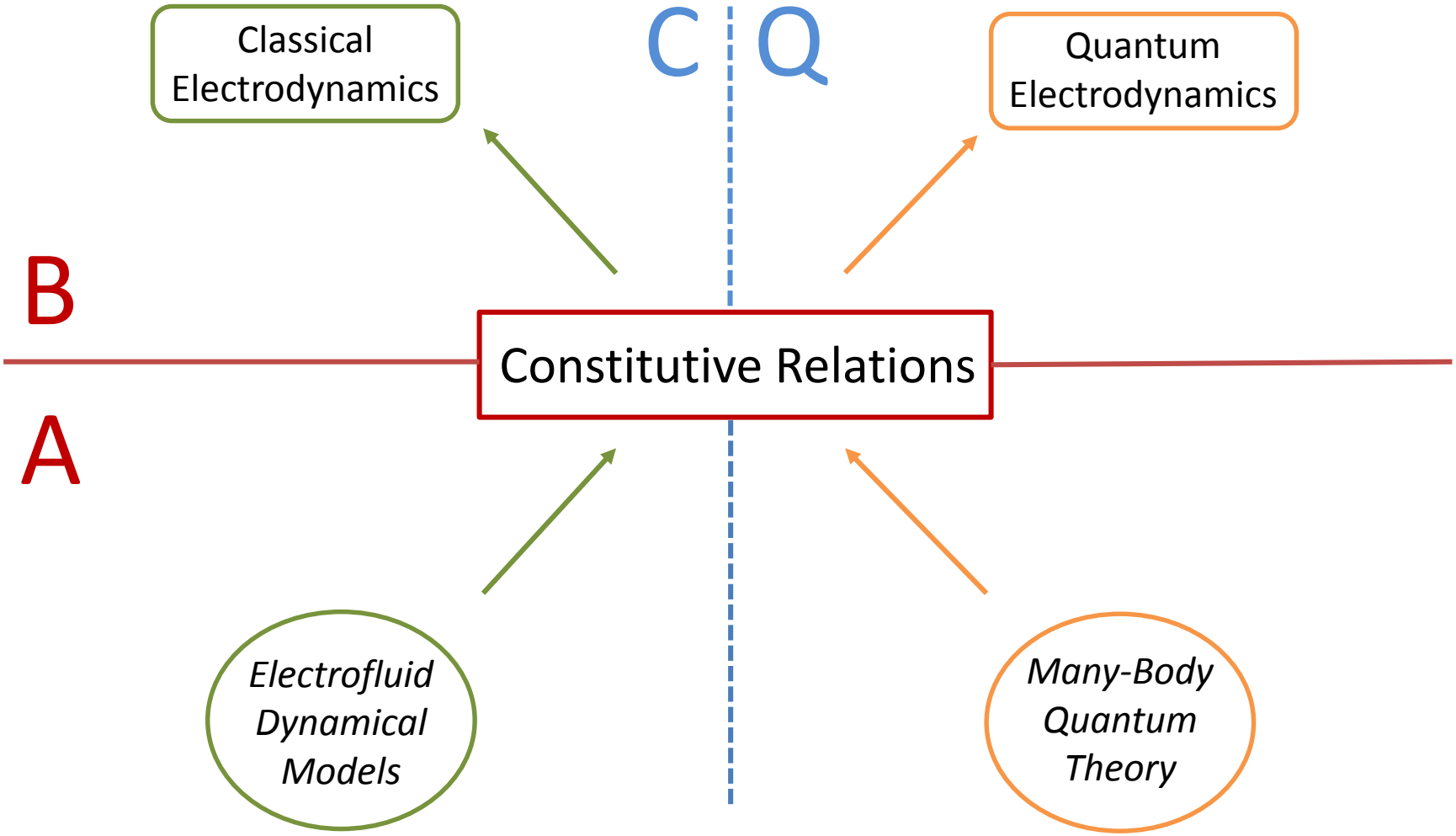
Background

- About me
  - Bachelor degree in Electronic Engineering, 2015 February, Università degli Studi di Napoli Federico II

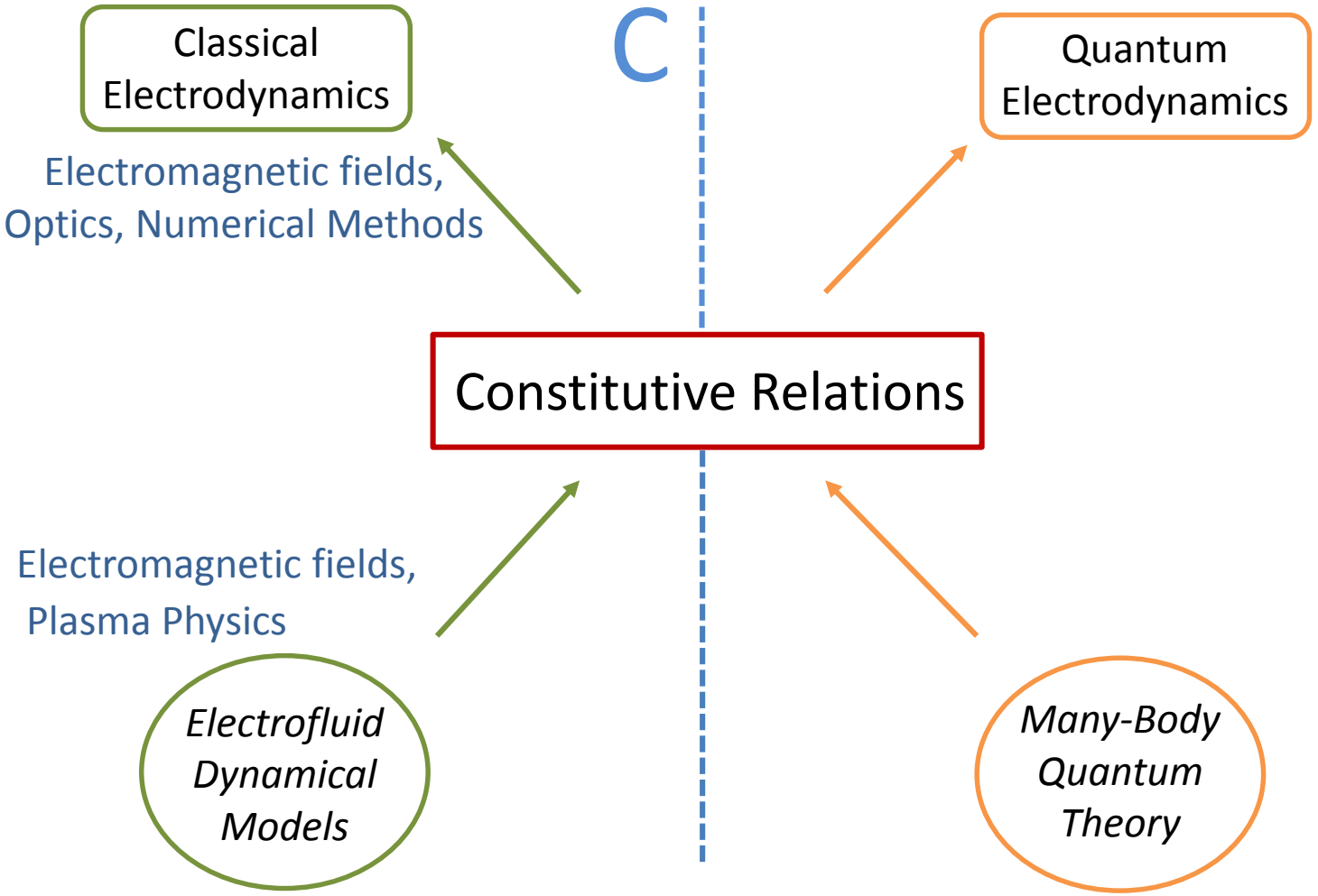
    Dalle soluzioni fondamentali alle parametrici per equazioni differenziali
  - Master degree in Electronic Engineering, 2016 October, Università degli Studi di Napoli Federico II

    Massimizzazione del Campo Magnetico su Nanoscala tramite l'uso di particelle metalliche
  - PhD ITEE, XXXII cycle, athenuem fellowship
- Research Group
  - Carlo Forestiere (tutor), Giovanni Miano, Mariano Pascale
- Enlarged Reserch Group
  - Claudio Serpico, Guglielmo Rubinacci, Antonio Quercia, Massimiliano d'Aquino, Valentino Scalera
- Collaborations
  - Physics: Arturo Tagliacozzo, Giampiero Pepe, Francesco Tafuri, Rodolfo Figari
  - Space Engineering: Gennaro Coppola
  - Electrical Engineering from University from Cassino: Antonello Tamburrino

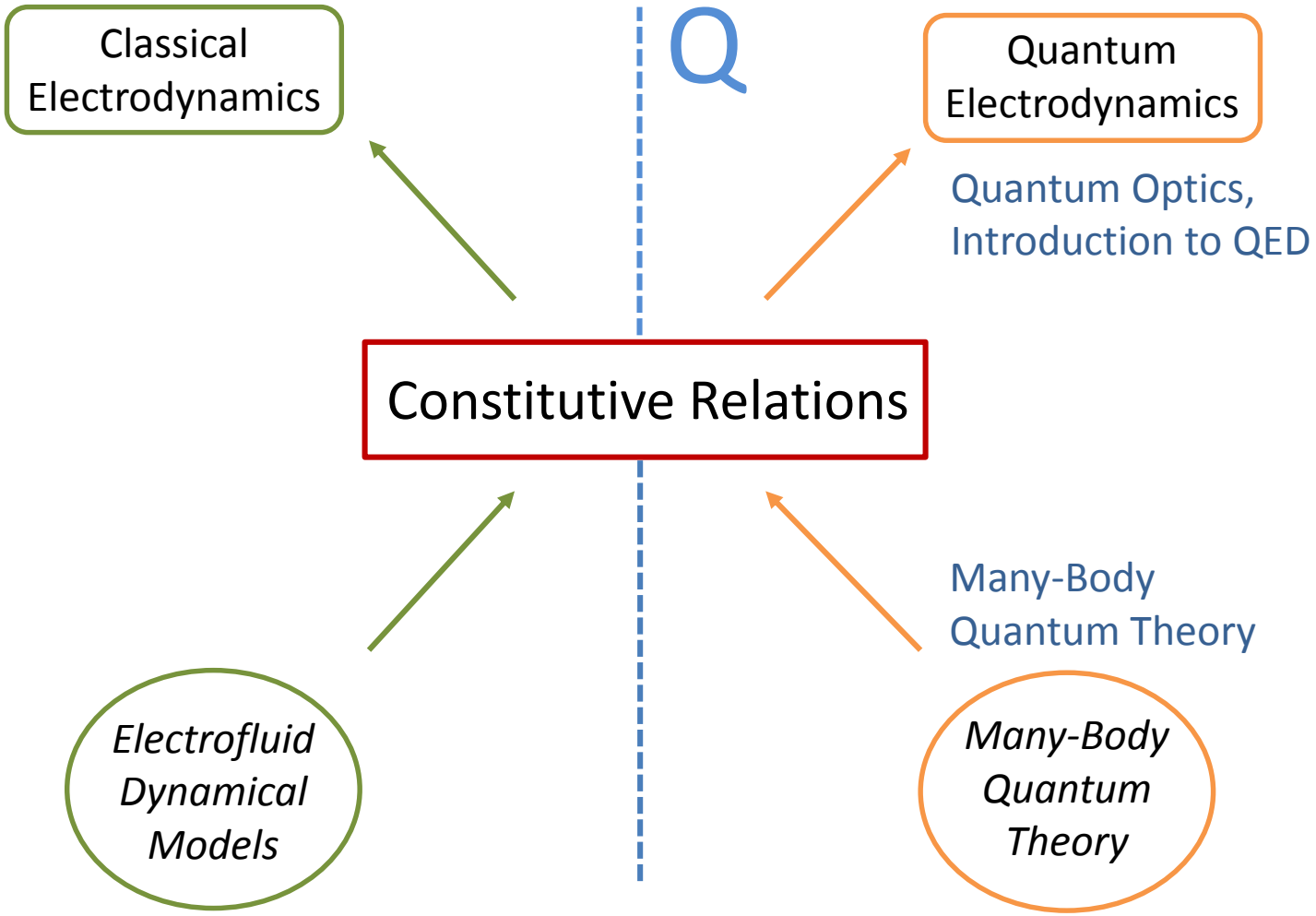
Nanoparticles Responce



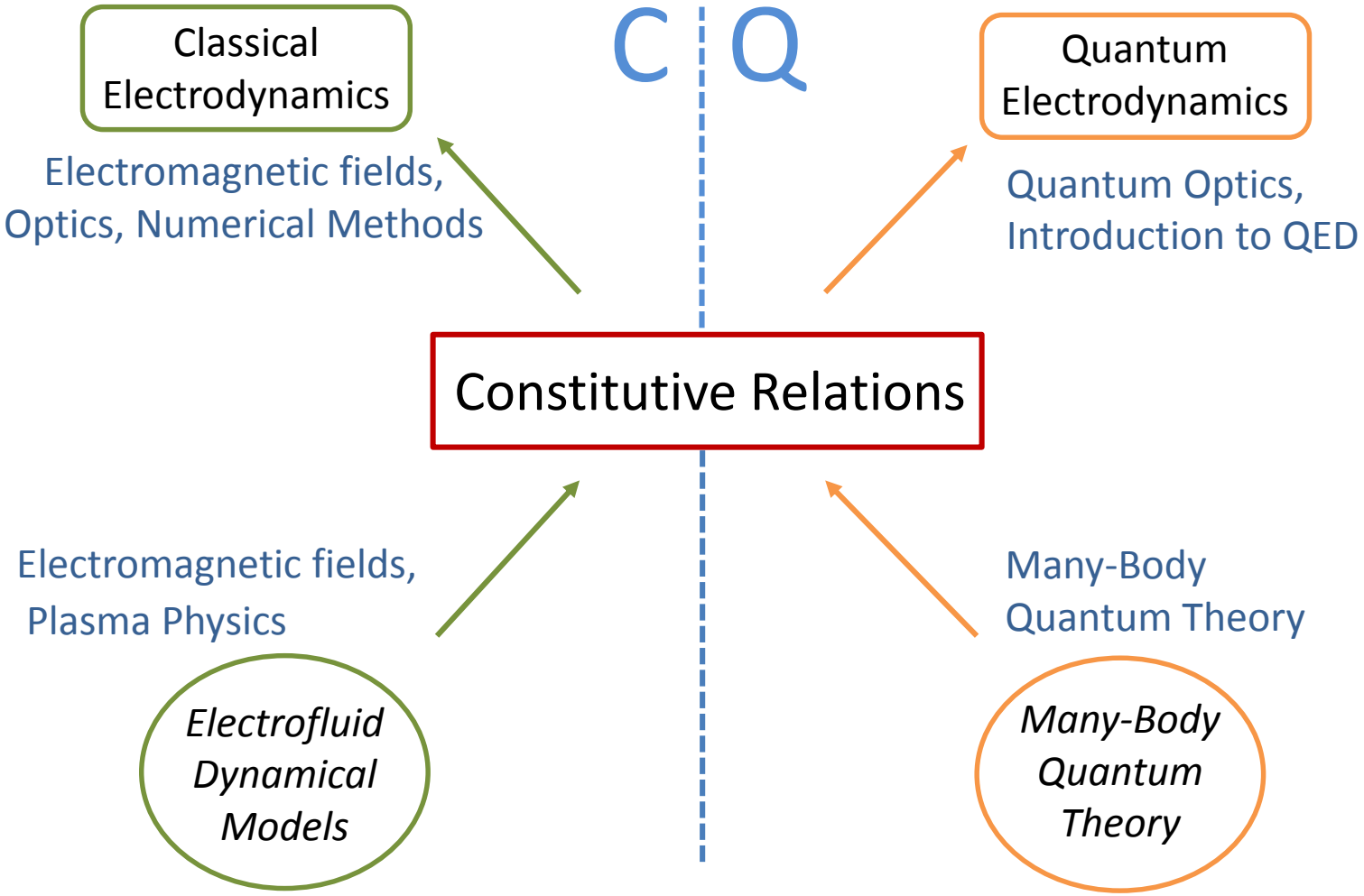
Master Degree



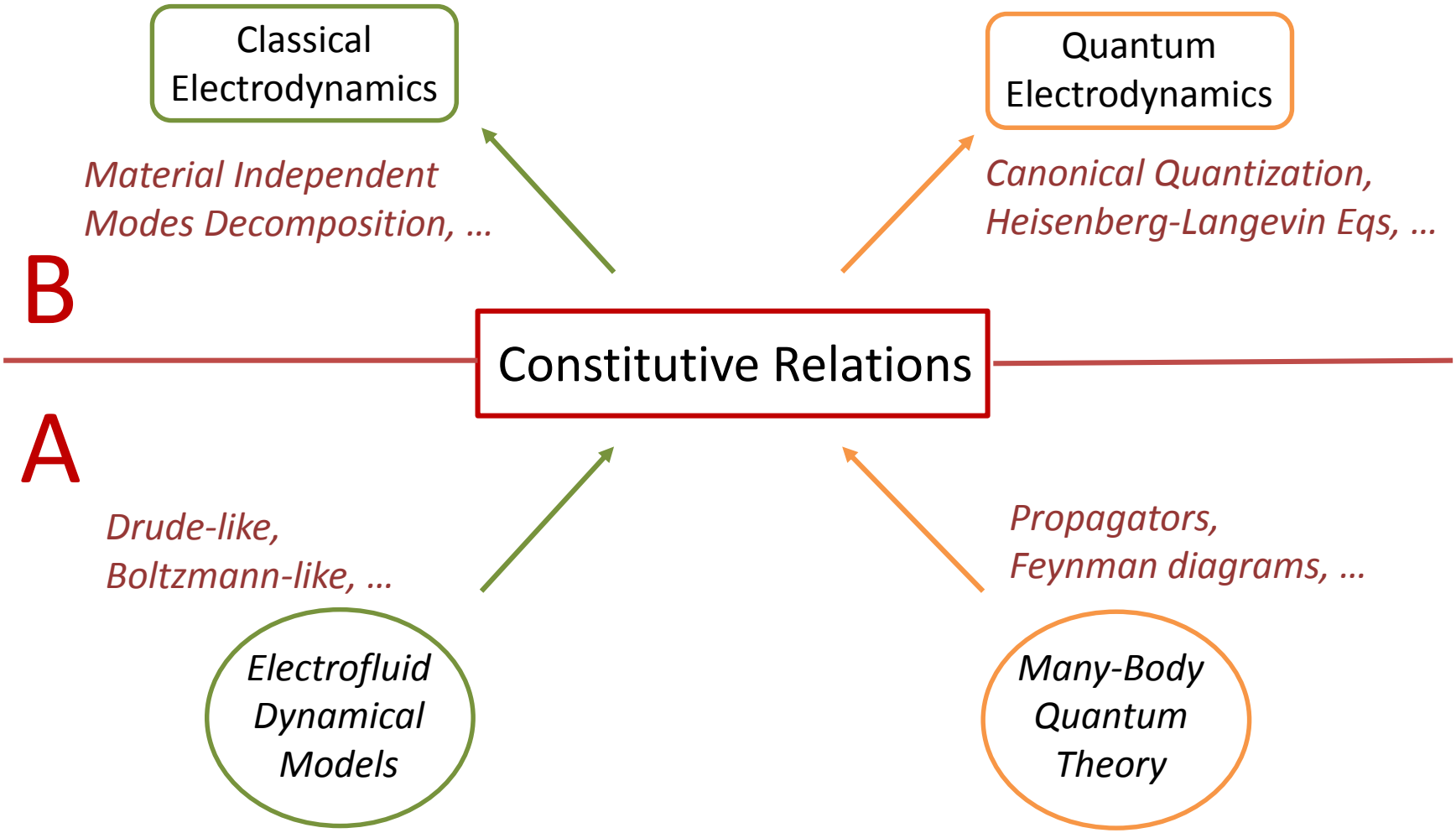
PhD Modules


Classical Electrodynamics
Q
Quantum Electrodynamics
Quantum Optics, Introduction to QED
Constitutive Relations
Many-Body Quantum Theory
Electrofluid Dynamical Models
Many-Body Quantum Theory

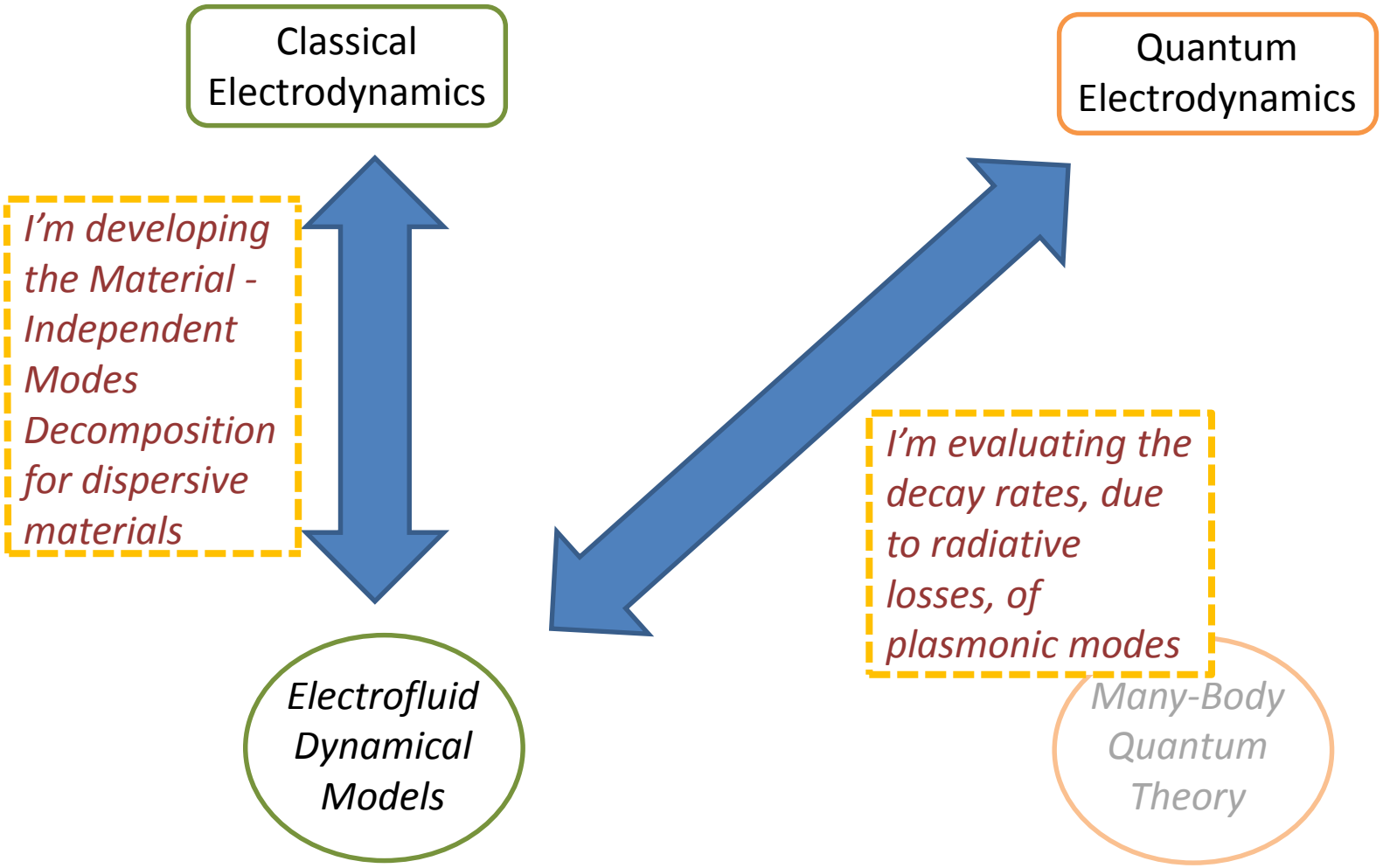
Education Summary



Some Methods



Something I'm doing



My Methodology

- Statement of the problem

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- Statement of the problem
- Study of both classical (textbooks) and modern (papers) literature about the topic

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- Analytic Calculations

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- New statement of the problem
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- Final statement of the problem

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- Study of both classical (textbooks) and modern (papers) literature about the topic
- New statement of the problem
- Analytic Calculations
- Final statement of the problem
- Numeric Calculations

My Methodology

- Statement of the problem
- Study of both classical (textbooks) and modern (papers) literature about the topic
- New statement of the problem
- Analytic Calculations
- Final statement of the problem
- Numeric Calculations
- Analysis of the analytic and numeric results

My first year timetable percentages

- Statement of the problem
- Study of both classical (textbooks) and modern (papers) literature about the topic → 50%
- New statement of the problem
- Analytic Calculations → 40%
- Final statement of the problem
- Numeric Calculations → 10%
- Analysis of the analytic and numeric results

Some Products

- Conferences:
  - EOS topical meeting at Capri, Anacapri
  - Plasmonica2017, Lecce, Best Oral Presentation
- Publications under review:
  - C. Forestiere, G. Miano, M. Pascale, R. Tricarico, chapter title: “A full-retarded spectral technique for the Fano-resonance analysis in a dielectric nanosphere”, Springer book: “Fano Resonances in Optics and Microwaves”
  - C. Forestiere, G. Miano, G. Rubinacci, A. Tamburrino, R. Tricarico, S. Ventre, “Material-Independent Modes of Arbitrarily Shaped Homogeneous Scatterers”, IEEE Transactions on Antennas and Propagation

Credits

	Credits year 1								Credits year 2							
		1	2	3	4	5	6			1	2	3	4	5	6	
	Estimated	bimonth	bimonth	bimonth	bimonth	bimonth	bimonth	Summary	Estimated	bimonth	bimonth	bimonth	bimonth	bimonth	bimonth	Summary
Modules	30	8	3	11	0	0	8	30	20							0
Seminars	10	0.4	0	0.4	6	3	0	9	10							0
Research	20	3	5	3	3	6	1	21	30							0
	60	11	8	14	9	9	9	60	60	0	0	0	0	0	0	0

MODULES

- Introduction to Quantum Electrodynamics
- Quantum Optics
- Many-Body Quantum Theory
- Group Theory and Application
- Introduction to Quantum Electrodynamics

PHD SCHOOLS

- PhD course of Antenna Synthesis
- XLII Scuola estiva di Fisica Matematica
- PhD school “Ferdinando Gasparini”

Next Year

	Credits year 1								Credits year 2							
		1	2	3	4	5	6			1	2	3	4	5	6	
	Estimated	bimonth	bimonth	bimonth	bimonth	bimonth	bimonth	Summary	Estimated	bimonth	bimonth	bimonth	bimonth	bimonth	bimonth	Summary
Modules	30	8	3	11	0	0	8	30	20							0
Seminars	10	0.4	0	0.4	6	3	0	9	10							0
Research	20	3	5	3	3	6	1	21	30							0
	60	11	8	14	9	9	9	60	60	0	0	0	0	0	0	0

- Study of both classical (textbooks) and modern (papers) literature about the topic 50% → 40%
- Analytic Calculations 40%
- Numeric Calculations 10% → 20%
- I would like to get on with the quantum line
- I would like to start to work on graphene, as the archetype of 2D materials

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XXXII Cycle - I year presentation

I thank you for the attention

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