Frequency
Domain
Multidimensional
Spectroscopy
with Applications
in Semiconductor
Photophysics

Blaise Thompson

CMDS

Frequency domai

i ne instrumen

Processin

Acquisition

Applications

Development of Frequency Domain Multidimensional Spectroscopy with Applications in Semiconductor Photophysics

Blaise Thompson

University of Wisconsin-Madison

2018-04-23



Frequency Domain Multidimensional Spectroscopy with Applications in Semiconductor Photophysics

Blaise Thompson

CMDS

Frequency domain

The instrume

Processin

Acquisition

Application

The Wright Group focuses on the development and usage of coherent multidimensional spectroscopy (CMDS).

[DEFINITION OF CMDS]



Domain
Multidimensional
Spectroscopy
with Applications
in Semiconductor
Photophysics

Blaise Thompson

CMDS

Frequency domai

The instrum

Processin

Acquisition

Application

[A BUNCH OF COOL PUBLICATIONS—FOCUSING ON COHERENCE TRANSFER, MECHANISMS ETC]



Analytical

Domain
Multidimensional
Spectroscopy
with Applications
in Semiconductor
Photophysics

Blaise Thompson

CMDS

Frequency domai

The instrum

Processin

Acquisition

Application

But wait! I'm an Analytical Chemist?!

[REASONS FOR ANALYTICAL CHEMISTRY TO BE INTERESTED IN CMDS]



Domains of CMDS

Domain
Multidimensiona
Spectroscopy
with Applications
in Semiconductor
Photophysics

Blaise Thompson

CMDS

Frequency domain

The instrume

Processin

Acquisition

Applications

CMDS can be collected in two domains:

- ► time domain
- ► frequency domain



Domain
Multidimensiona
Spectroscopy
with Application
in Semiconducto

Blaise Thompso

CMDS

Frequency domain

he instrume

Processin

Acquisition

Application

[DESCRIPTION OF TIME DOMAIN]

Time domain



Domain Multidimension: Spectroscopy with Application in Semiconductor

Blaise Thompson

CMDS

Frequency domain

he instrume

Processin

Acquisition

Application

[DESCRIPTION OF FREQUENCY DOMAIN]

Frequency domain



Frequency Domain Multidimensional Spectroscopy with Applications in Semiconductor Photophysics

Blaise Thompson

CMDS

Frequency domain

The instrumen

Processing

Acquisition

Application

Most experiments are collected in the time domain

- ► fast
- ► robust

So... why frequency domain?



Frequency
Domain
Multidimensional
Spectroscopy
with Applications
in Semiconductor

Blaise Thompson

CMD5

Frequency domain

The instrumen

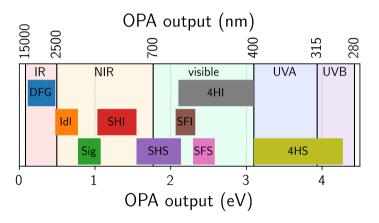
Processin

Acquisitior

Applications



Bandwidth



Domain
Multidimensional
Spectroscopy
with Applications
in Semiconductor

Blaise Thompsor

CMD

Frequency domain

The instrumen

Processin

Acquisition

Applications



Selection rules

Frequency
Domain
Multidimensional
Spectroscopy
with Applications
in Semiconductor

Blaise Thompson

CMDS

Frequency domai

The instrument

Processing

Acquisition

Applications



The instrument

Frequency Domain Multidimensional Spectroscopy with Applications in Semiconductor

Blaise Thompson

CMDS

Frequency domai

The instrument

Processing

Acquisition

Applications



Processing

Domain
Multidimensional
Spectroscopy
with Applications
in Semiconductor

Blaise Thompson

CMDS

Frequency domai

The instrumen

Processin

Acquisition

Applications



Acquisition

Domain
Multidimensional
Spectroscopy
with Applications
in Semiconductor

Blaise Thompson

CMD5

Frequency domai

The instrumen

Processin

Acquisition

Applications



Applications