

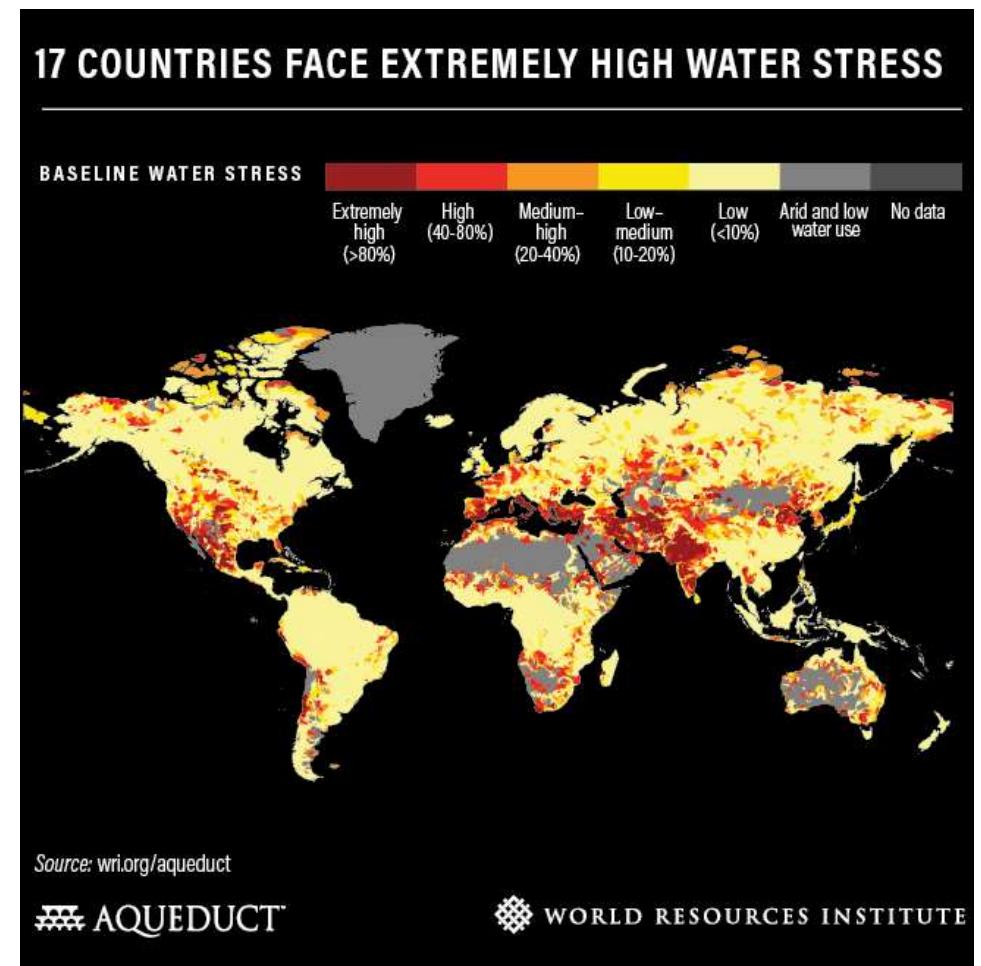
# Agrohydrological sensing and modeling for the analysis of drought and mitigation actions: The experience of the AgrHySMo laboratory

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Piero a Grado (PI)



# Drought phenomenon

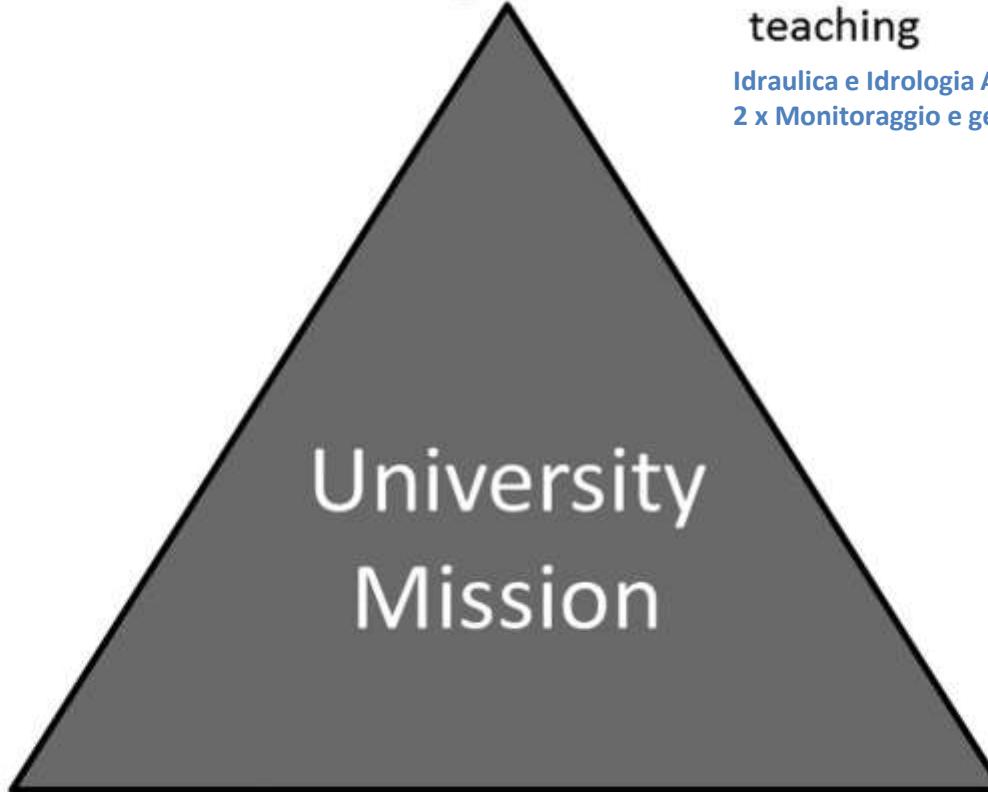


## Knowledge Transmission

teaching

Idraulica e Idrologia Agraria

2 x Monitoraggio e gestione della risorsa idrica



## Knowledge Transfer

application of knowledge

Wireless Sensor Network (WSN) for Drought  
Analysis and Mitigation Action

## Knowledge Creation

research

ATMOSMART  
High-throughput screening (HTS)

# Knowledge transfer: DSS for feed-back control irrigation



Soil moisture based-Wireless Sensor Network



- Cybernetic platform → awareness
- Fine tuning of the irrigation event
- Watering duration → ≈5h
- Water saving → ≥ 35%

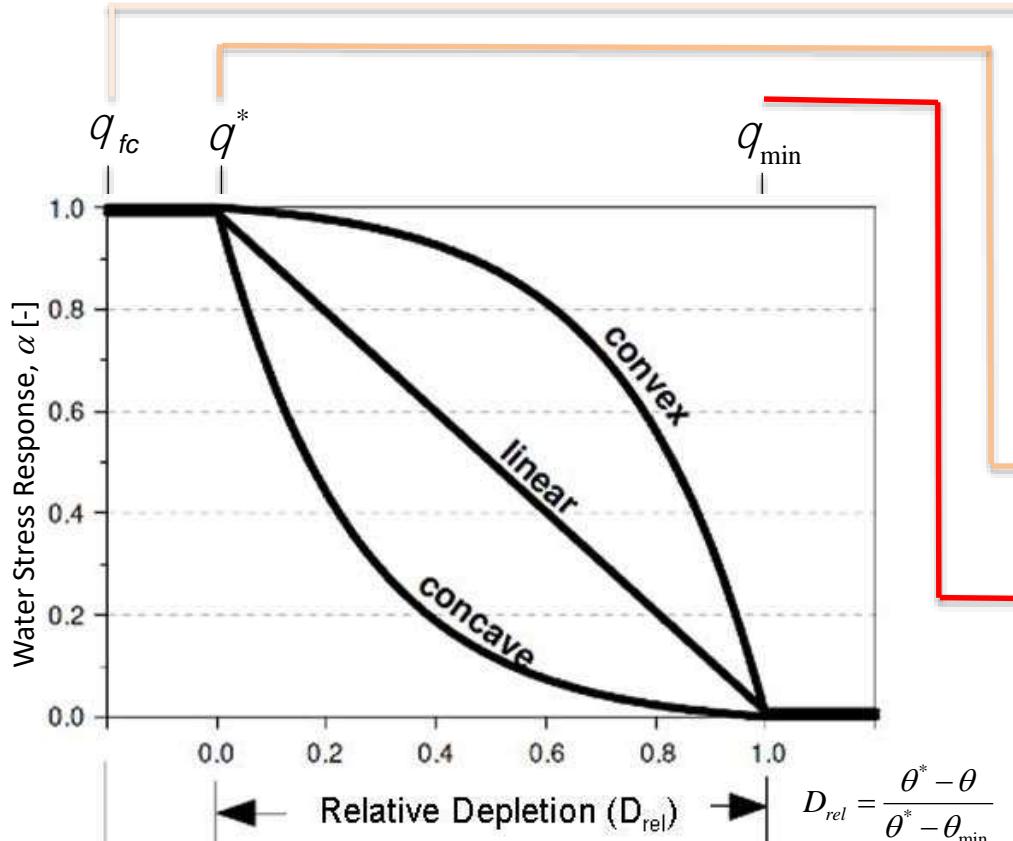
# Knowledge creation: High-throughput screening (HTS) modular system for the crop drought and salinity stress response modeling

reflectometry + gravimetry



# Knowledge creation: High-throughput screening (HTS) modular system for the crop drought and salinity stress response modeling

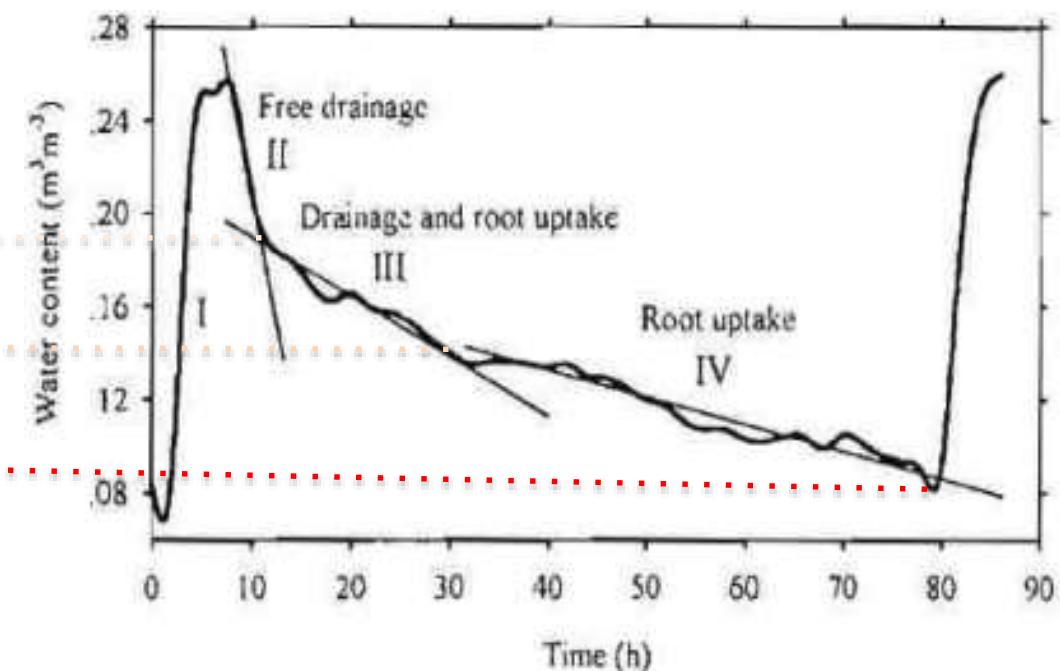
Water Stress Function (WSF)



Flux regulated by the weather

Flux regulated by the Soil water status

Self-calibration procedure  
Detecting WSF parameters

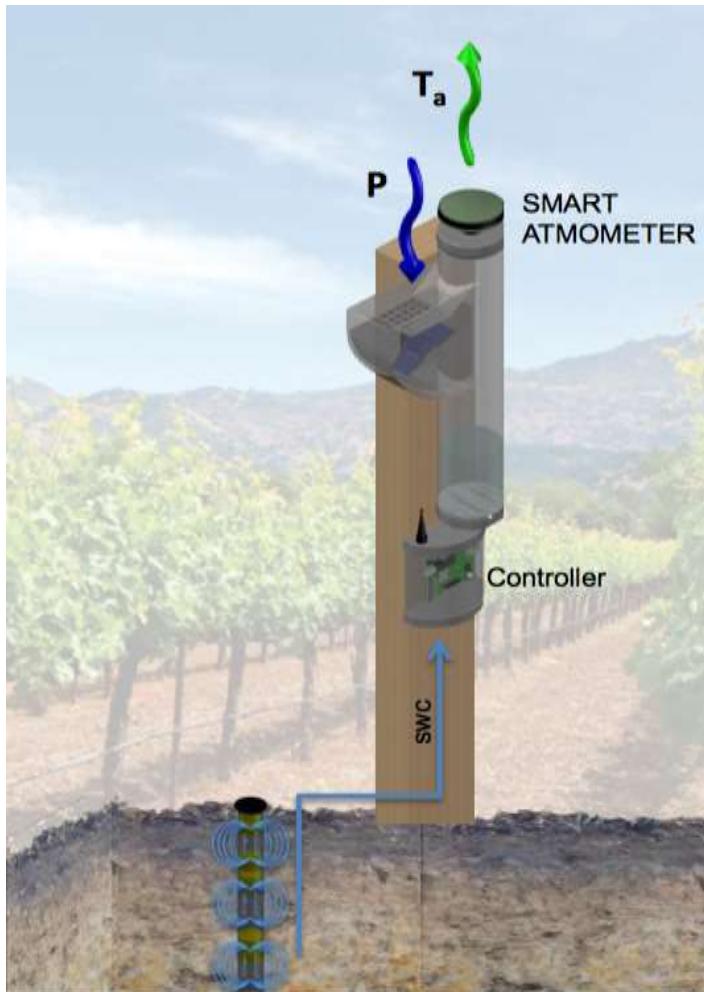


# Knowledge creation: Smart Atmomter for the real-time monitoring of Actual Transpiration

Bando Dimostratori  
Tecnologici-2018,  
Università di Pisa



Prof. Giovanni Rallo (coordinator)  
Prof. Rossano Massai  
Prof. Damiano Remorini  
Dr. Andrea Sbrana  
Àngela Puig-Sirera (PhD stud.)



## Technology Demo

- Italian industrial patent
- international patent (PCT) pending

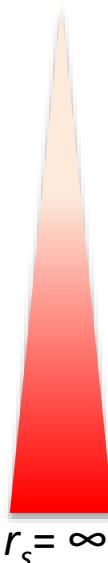


Prof. Vishnu Sundaresan  
Dr. Hery Travis  
Parker Evans (PhD stud.)



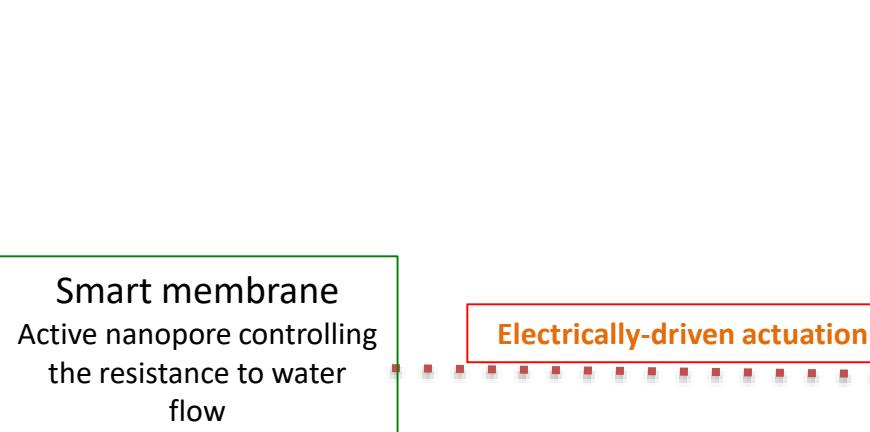
# Critical Task I: learn how to respond versus the soil water status

$$r_s = 100 \text{ s m}^{-1}$$

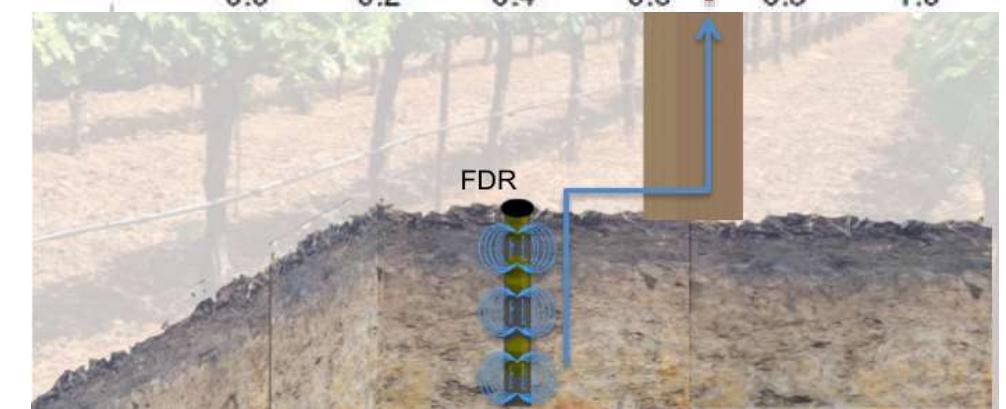
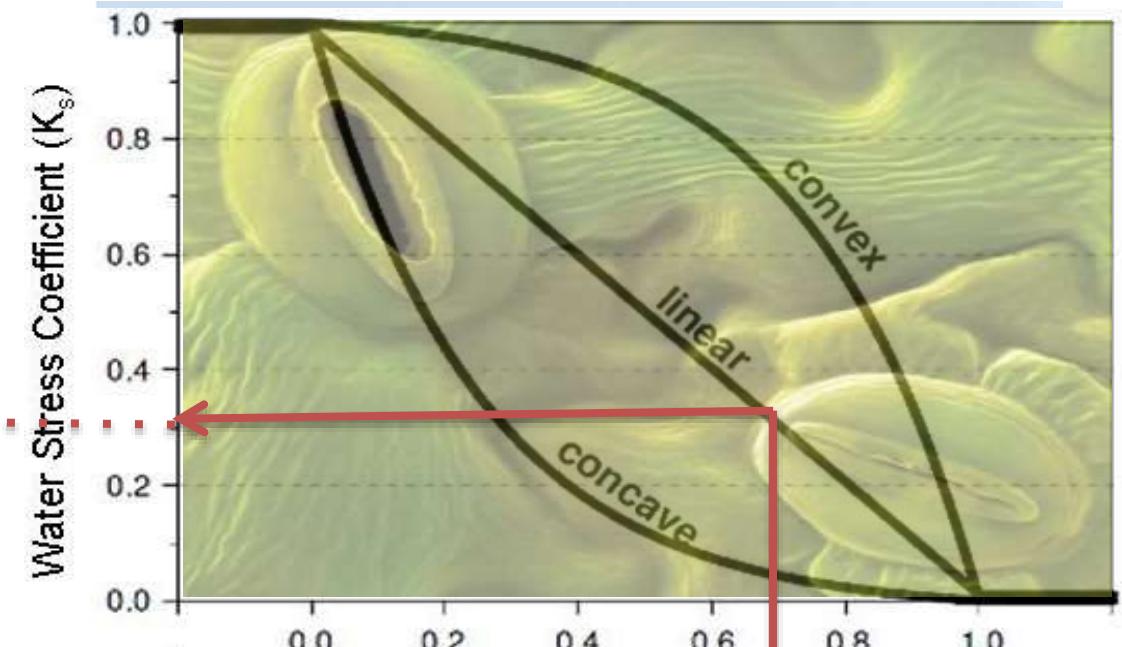


**Smart membrane**  
Active nanopore controlling  
the resistance to water  
flow

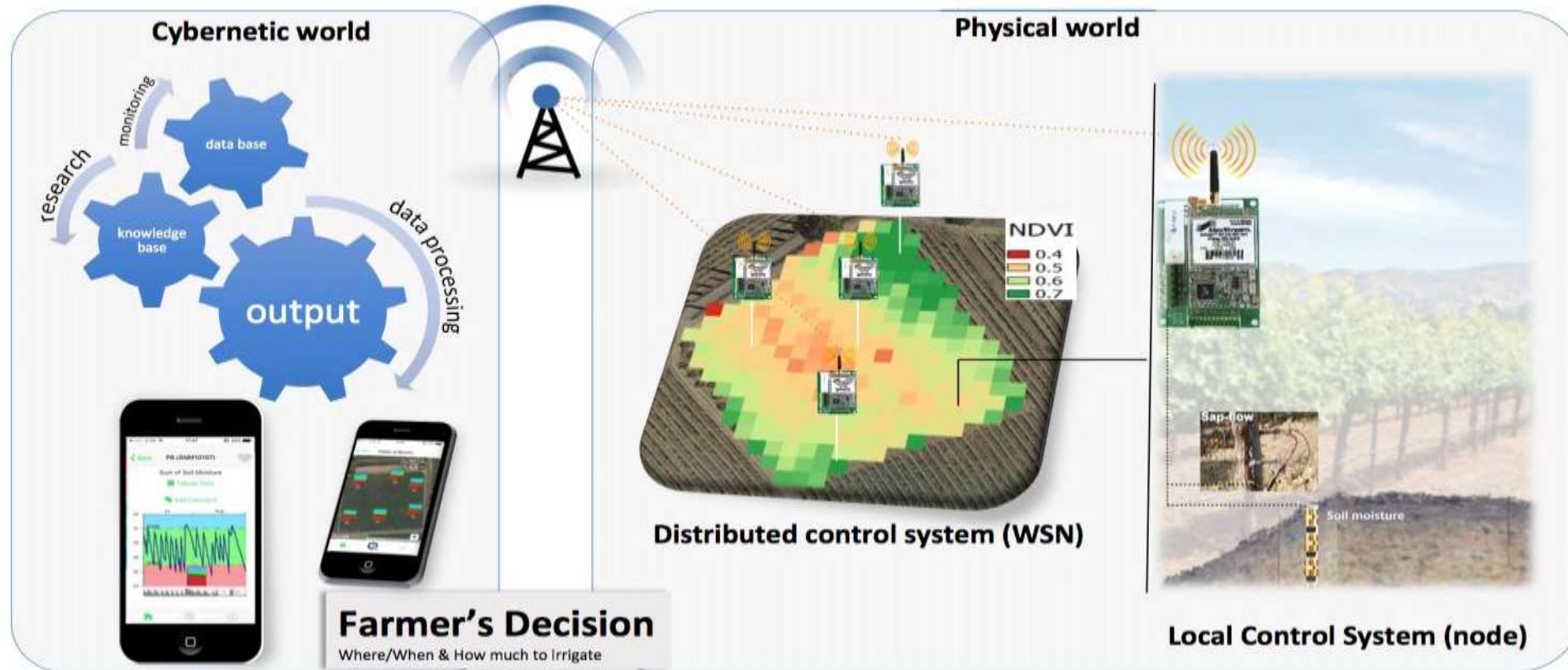
Electrically-driven actuation



WSF-macroscopic approach



# Thanks for your attention!



Contacts

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