ISMA ▪ UCBL ▪ INNO ▪ KT

11-12 December Workshop (SUCCESS FP-7)

Round Table

Many activities with a single goal !

The goal: a single wide project design

New project skeleton and umbrella

Mutual physical idea and ability to upscale physical model is the core for the project skeleton

Multi country (scientific centers), interdisciplinary and Europe priority orientation is the base for project umbrella

To be or not to be ?

Round table agenda:

1. General questions, the goal approval
2. What we have to know for new EC application
3. Physical model; criticism and comments
4. Our experimental capabilities
5. Formal claims and satisfaction to EC policy
6. Next steps plan, meetings, promotion

Current meeting main decision (before criticism)

(Four YES decision need…

Questions we have to reply to our self at first and in project secondly

1. **Is new idea good enough to upscale scintillation model to higher level?**
   YES 1

2. **Can we properly plan the list of experiments? Can we add some more ideas if necessary? YES 2**

3. **Are we sure that can (all together) resolve all problems? Do we have enough resources and capacity? YES 3**

4. **Do we have a goodwill to take a part in new consortium? YES 4**

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What we have to keep in mind:

Olga Kiffer (INNO)

* Strategic agendas in NMP and possible collaboration topics

** SUCCESS FP7 exit strategy with respect to the outcomes of the Day 1 discussion

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Cascade

Transport

Center

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ERA-WIDE

$(\beta E_g)^{-1}$

S

Q

Inelastic electron-electron scattering

e e h

CONDUCTION BAND

Thermalization of electrons

Creation of excitons, capture of electrons and holes by different

$2E_g$

E_g

0

ΔE_v

E_c

$E_c + \Delta E_c$

ph

Interaction of excitations

$c^* + c^* \rightarrow c + c^*$

Emission

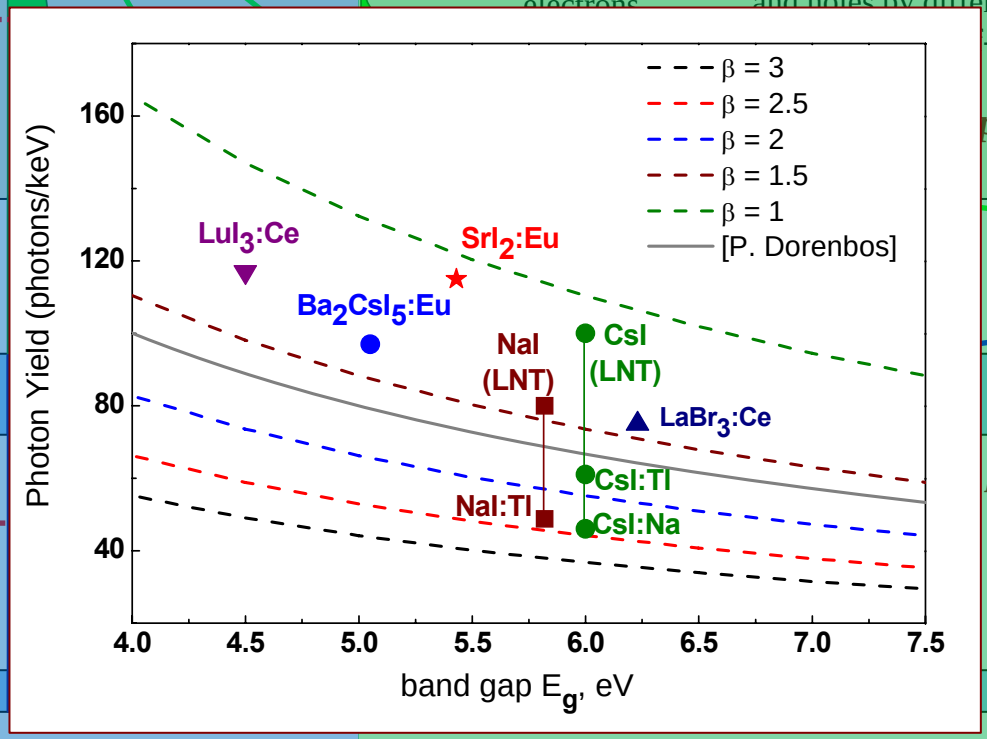
$c^* \rightarrow c + h\nu$

$ex + ex \rightarrow ex$

ph

VALENCE BAND

CORE BAND



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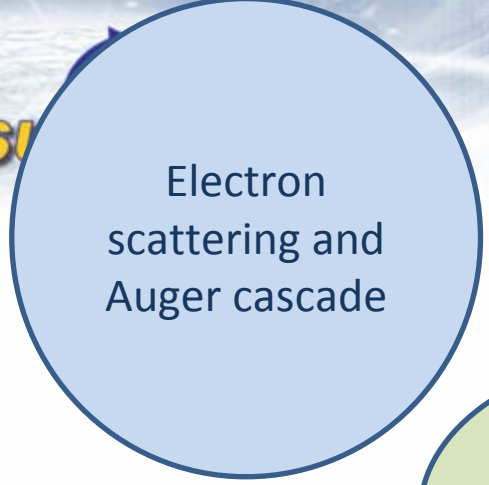
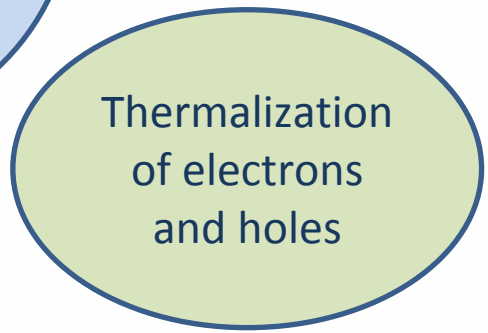
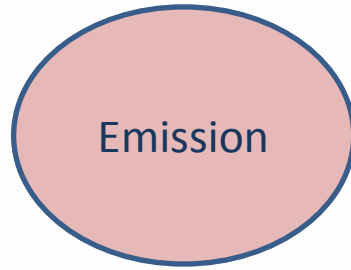
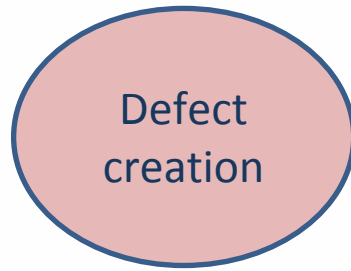


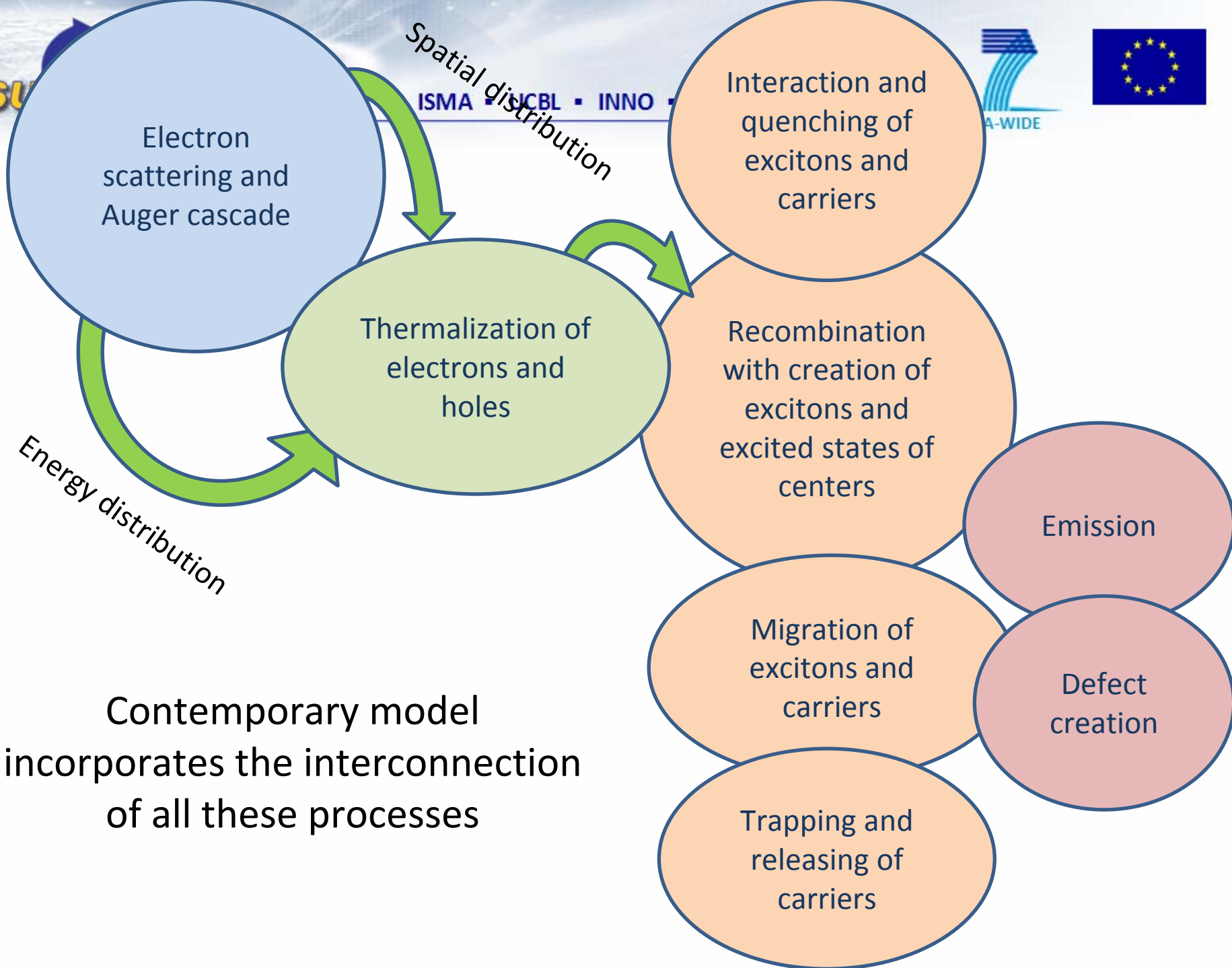




Are these processes independent?

NO!





Contemporary model incorporates the interconnection of all these processes

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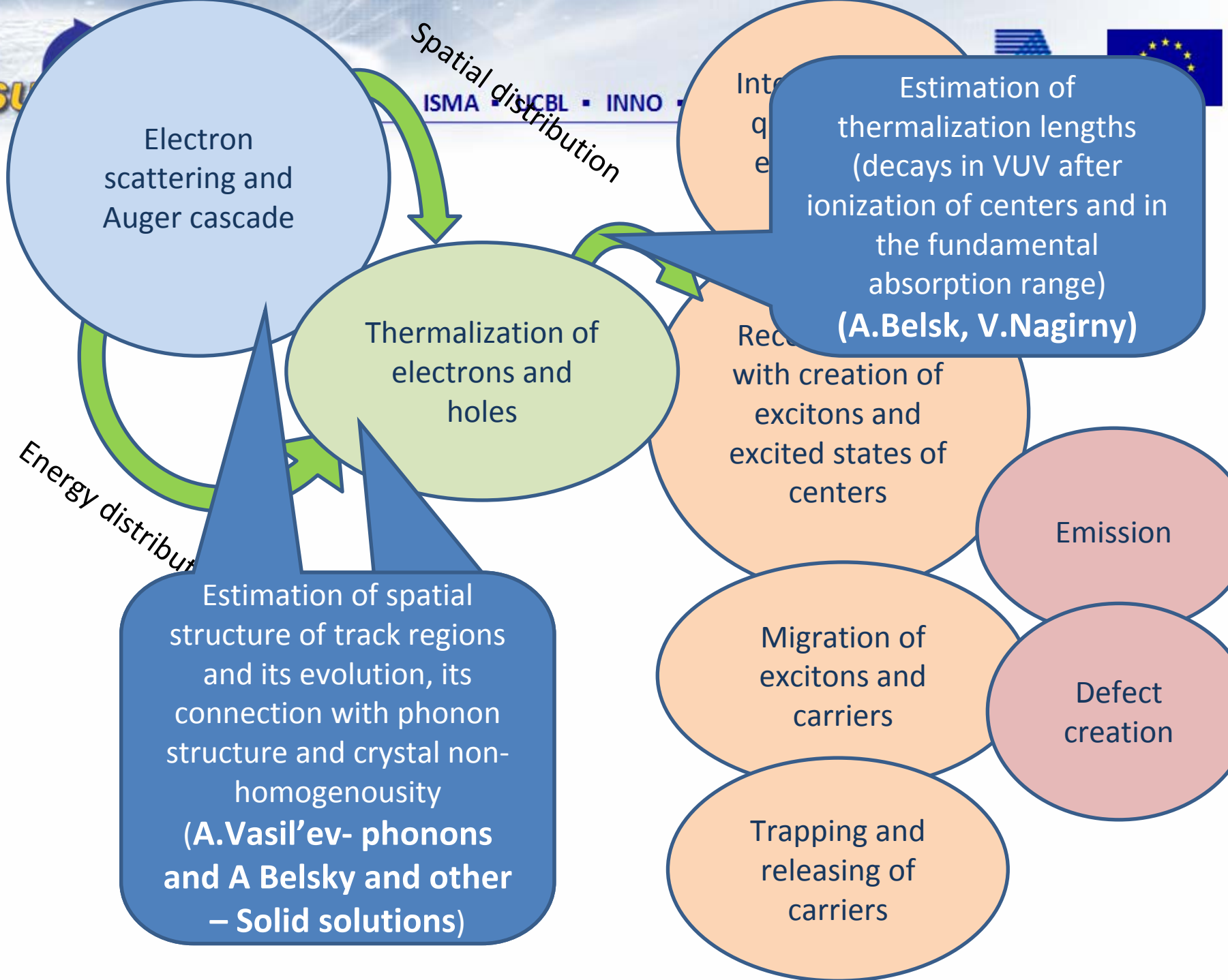
   The team selection…

1. Our experimental capabilities
2. Formal claims and satisfaction to EC policy
3. Next steps plan, meetings, promotion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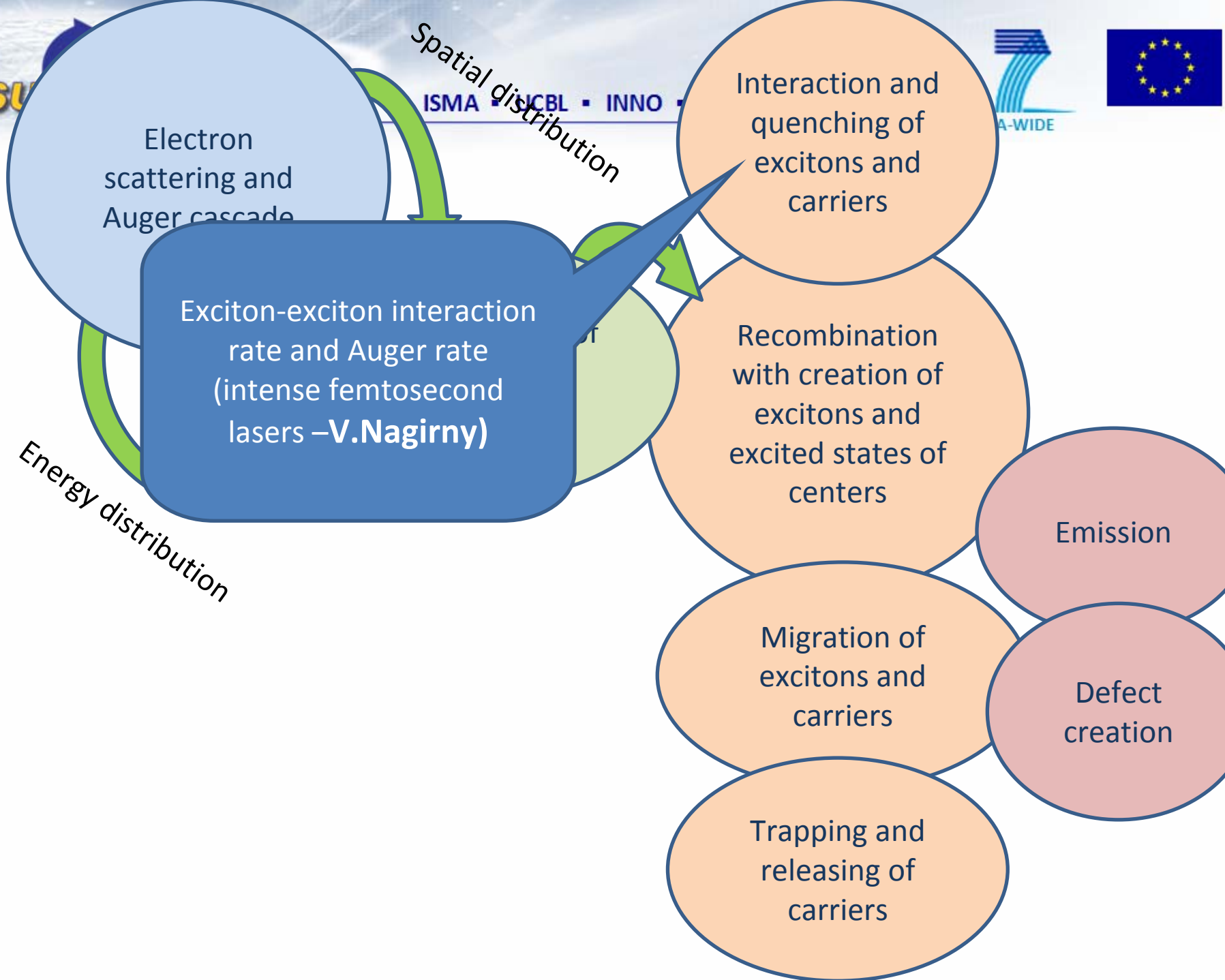
Electron scattering and Auger cascade
Spatial distribution
Thermalization of electrons and holes
Energy distribut
Estimation of thermalization lengths (decays in VUV after ionization of centers and in the fundamental absorption range) (A.Belsk, V.Nagirny)
with creation of excitons and excited states of centers
Emission
Migration of excitons and carriers
Defect creation
Trapping and releasing of carriers
Estimation of spatial structure of track regions and its evolution, its connection with phonon structure and crystal non-homogenousity (A.Vasil'ev- phonons and A Belsky and other – Solid solutions)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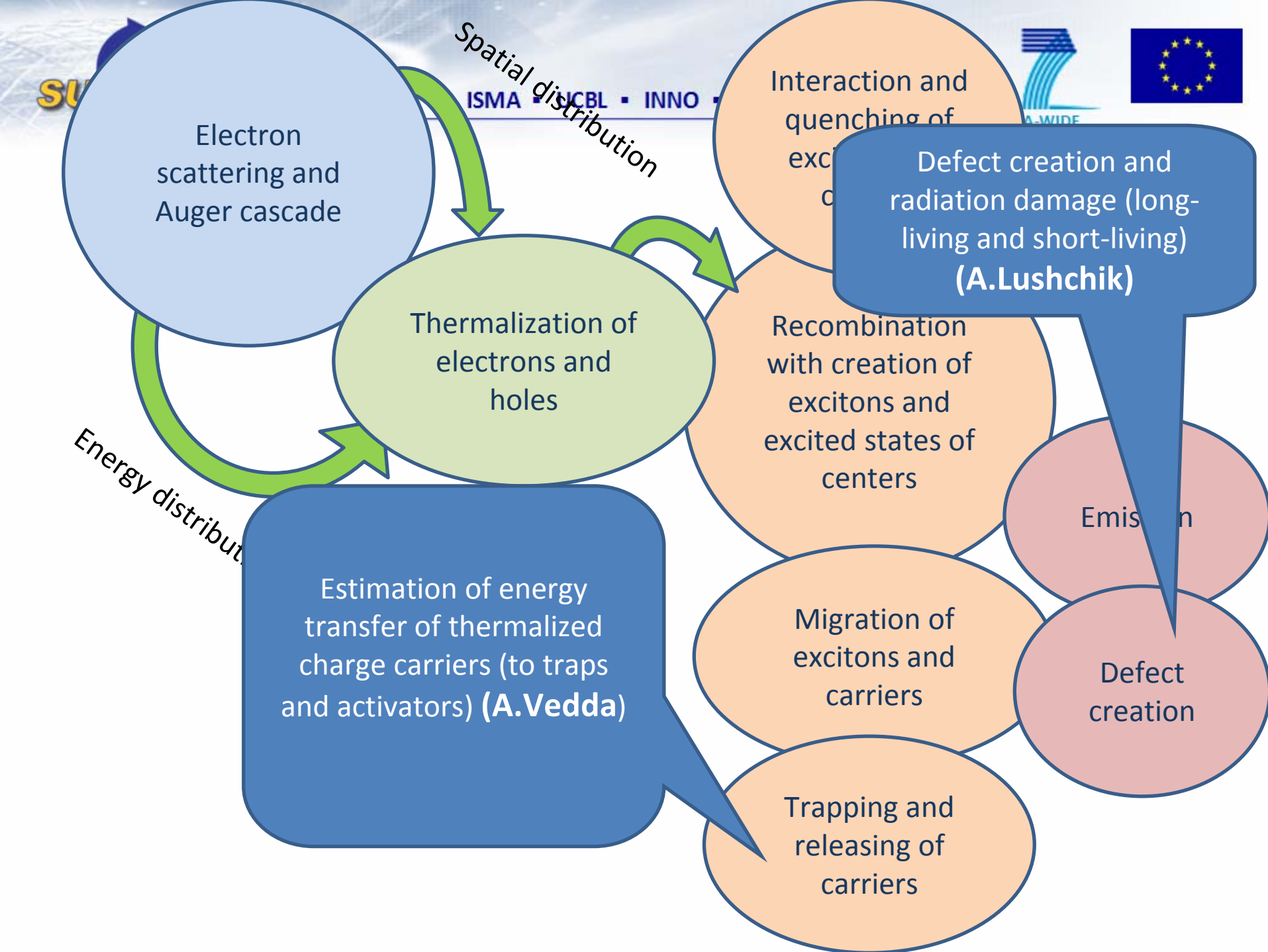
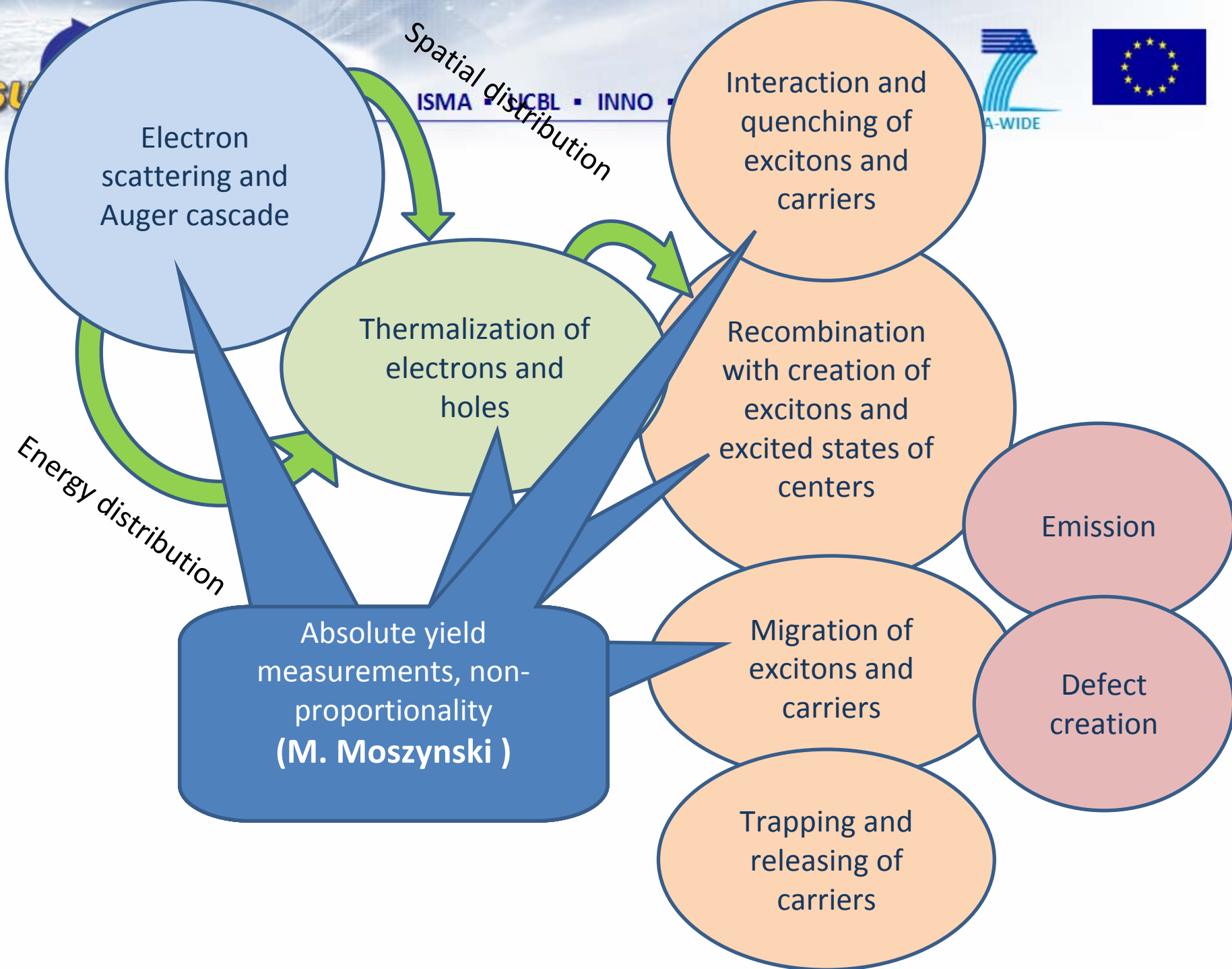
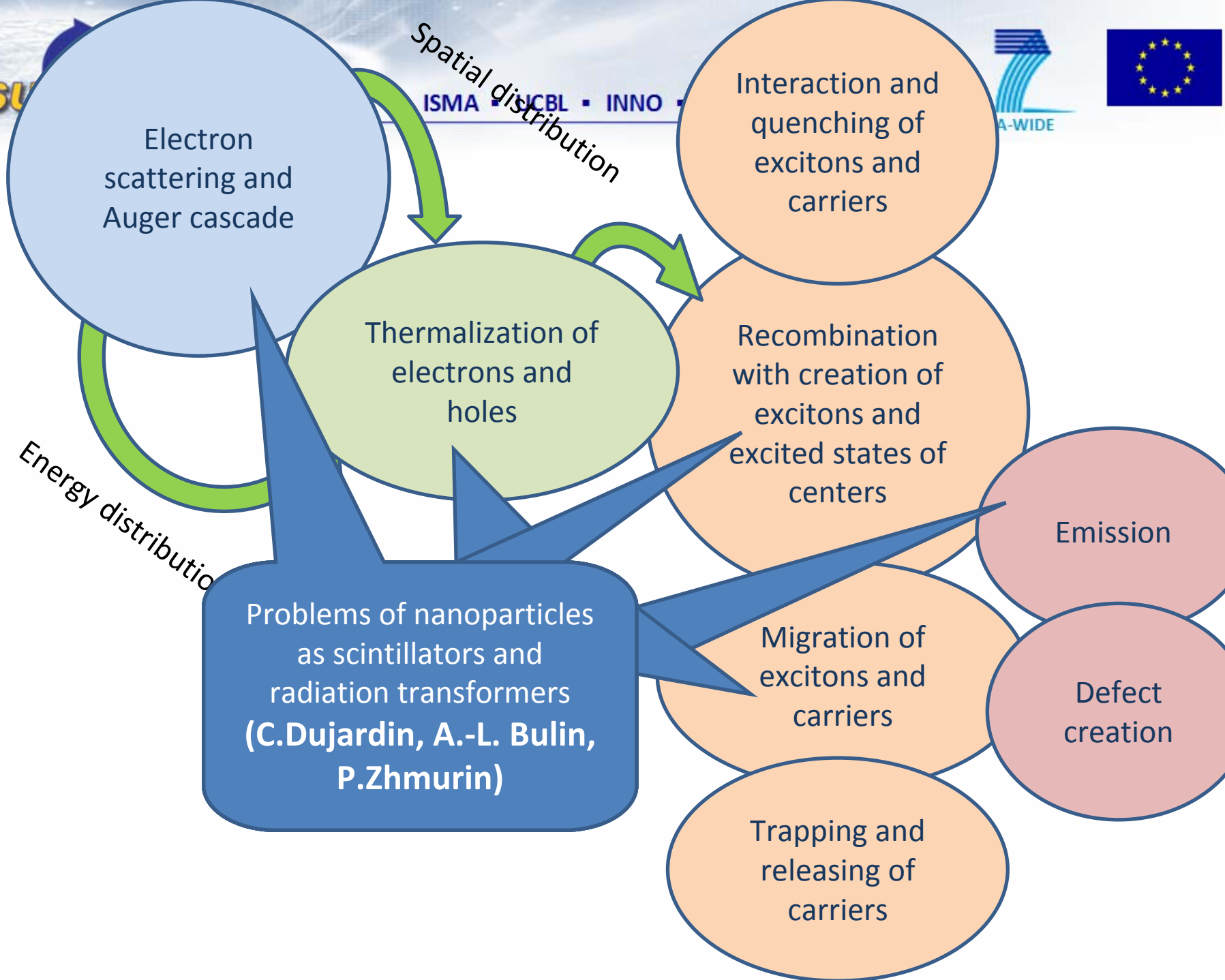
A-WIDE
Electron scattering and Auger cascade
Spatial distribution
Interaction and quenching of excitons and carriers
Exciton-exciton interaction rate and Auger rate (intense femtosecond lasers –V.Nagirny)
Recombination with creation of excitons and excited states of centers
Emission
Migration of excitons and carriers
Defect creation
Trapping and releasing of carriers
Energy distribution


ISMA ▪ ICBL ▪ INNO ▪
Electron scattering and Auger cascade
Spatial distribution
Interaction and quenching of exci
Defect creation and radiation damage (long-living and short-living) (A.Lushchik)
Thermalization of electrons and holes
Recombination with creation of excitons and excited states of centers
Energy distribut
Emis n
Estimation of energy transfer of thermalized charge carriers (to traps and activators) (A.Vedda)
Migration of excitons and carriers
Defect creation
Trapping and releasing of carriers


Electron scattering and Auger cascade
Spatial distribution
Interaction and quenching of excitons and carriers
Thermalization of electrons and holes
Recombination with creation of excitons and excited states of centers
Energy distribution
Emission
Absolute yield measurements, non-proportionality
(M. Moszynski)
Migration of excitons and carriers
Defect creation
Trapping and releasing of carriers


Electron scattering and Auger cascade
Spatial distribution
Interaction and quenching of excitons and carriers
Thermalization of electrons and holes
Recombination with creation of excitons and excited states of centers
Energy distributio
Problems of nanoparticles as scintillators and radiation transformers (C.Dujardin, A.-L. Bulin, P.Zhmurin)
Emission
Migration of excitons and carriers
Defect creation
Trapping and releasing of carriers

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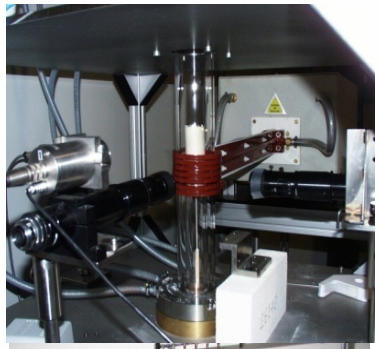
Growth technique (Bridgement, CZ, Micro-pulling and so on for mixed crystal growth)

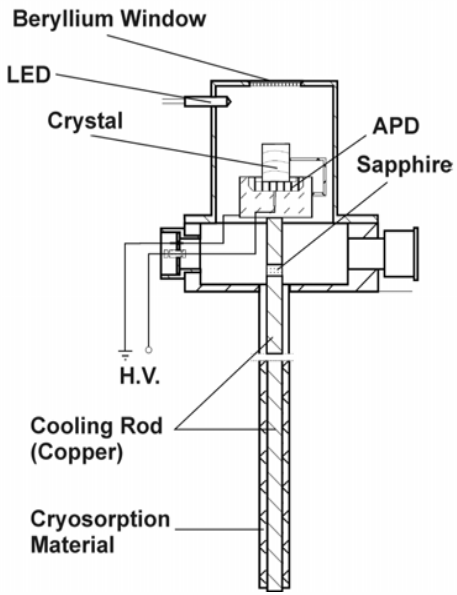
O.Sidletskyi, K.Lebbou, A.Petrosian

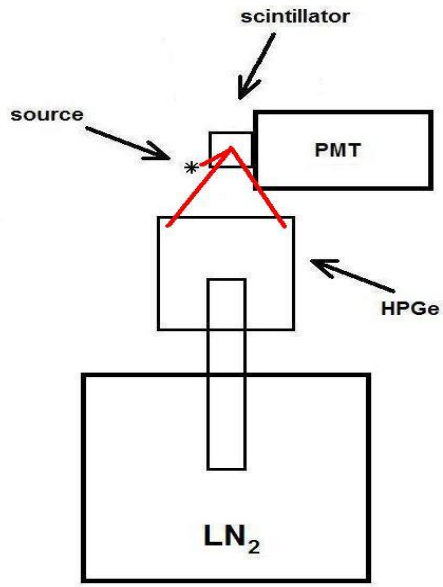


Gamma spectrometry at low temperatures, non-proportionality

LN_2 temperature

M.Moszyński and





Cryostat with NaI coupled to LAAPD

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EC motivations , criteria and implementations…

See in details S.Klessova & O.Kiffer

* Synergy from cooperation

* Efficient use of scientific capacities, European facility first of all

• Strong cooperation of ES and Associated Countries

• European priorities for advance science

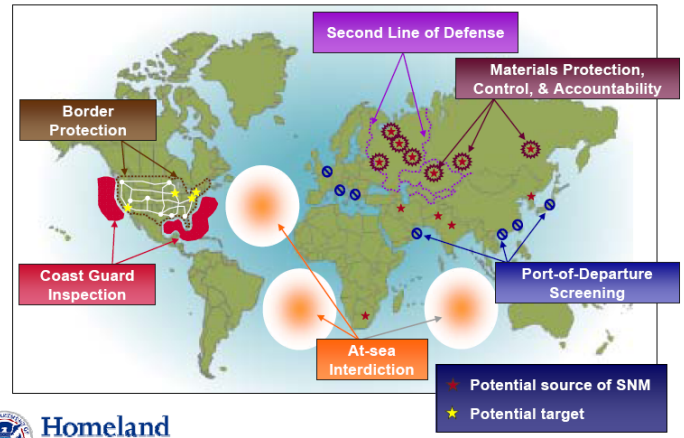
• Background strengthening for European industry use…?
Bridge between result and future technology

* Implementation ! (Industry, medicine, security etc)

Strategy of materials search

- → *Serendipity*
- → *Search and errors «cook and look»*
- → *Back grounded selection*

Implementation



Homeland Security

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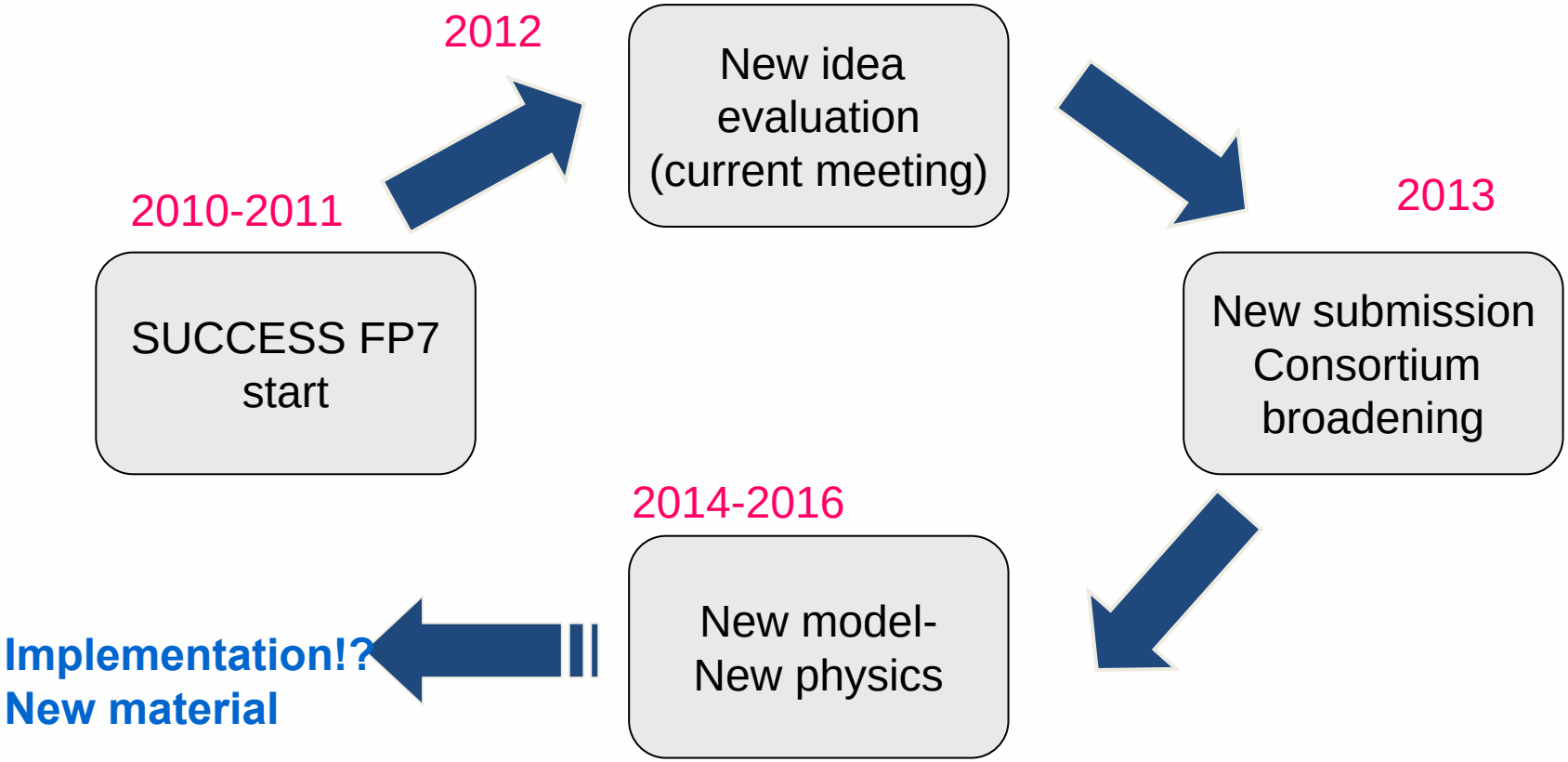

From idea to results and implementation !

Next potential steps (announce, promotion, meetings):

(To the Round Table discussion)

- SCINT-13 promotion …? April 13
- Virtual laboratory (VL) experiments planning and info exchange
- Mutual publications?
- Broad meeting (EC support in frame of SUCCESS conference in Ukraine)
- Call and proposal submission (INNO)
- IEEE NSS/MIC promotion? Nov 13

Thank you for attention!