



Role of Regional Academic Institutions in Flexible Electronics Development in Ohio

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FLEXIBLE ELECTRONICS

Flexible displays



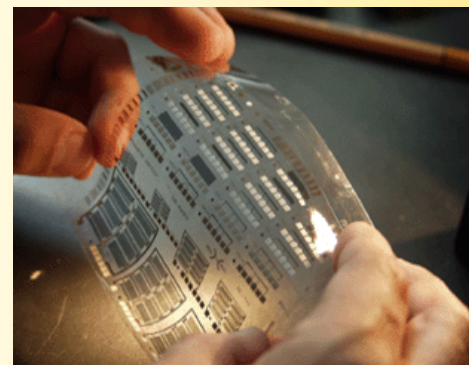
Flexible Battery



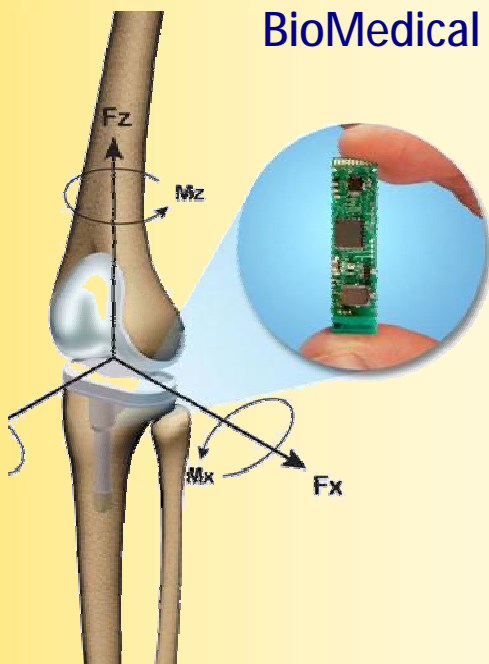
Soft Sensors



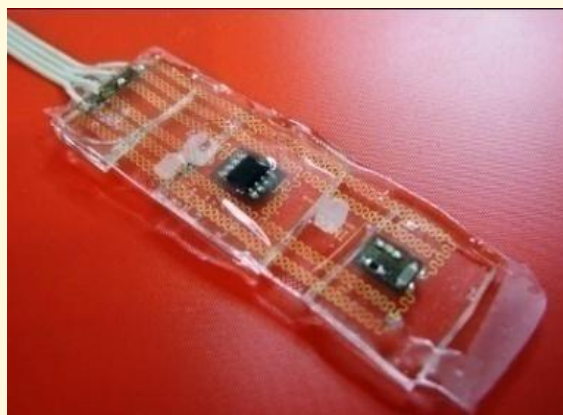
Printed Circuits



BioMedical Devices



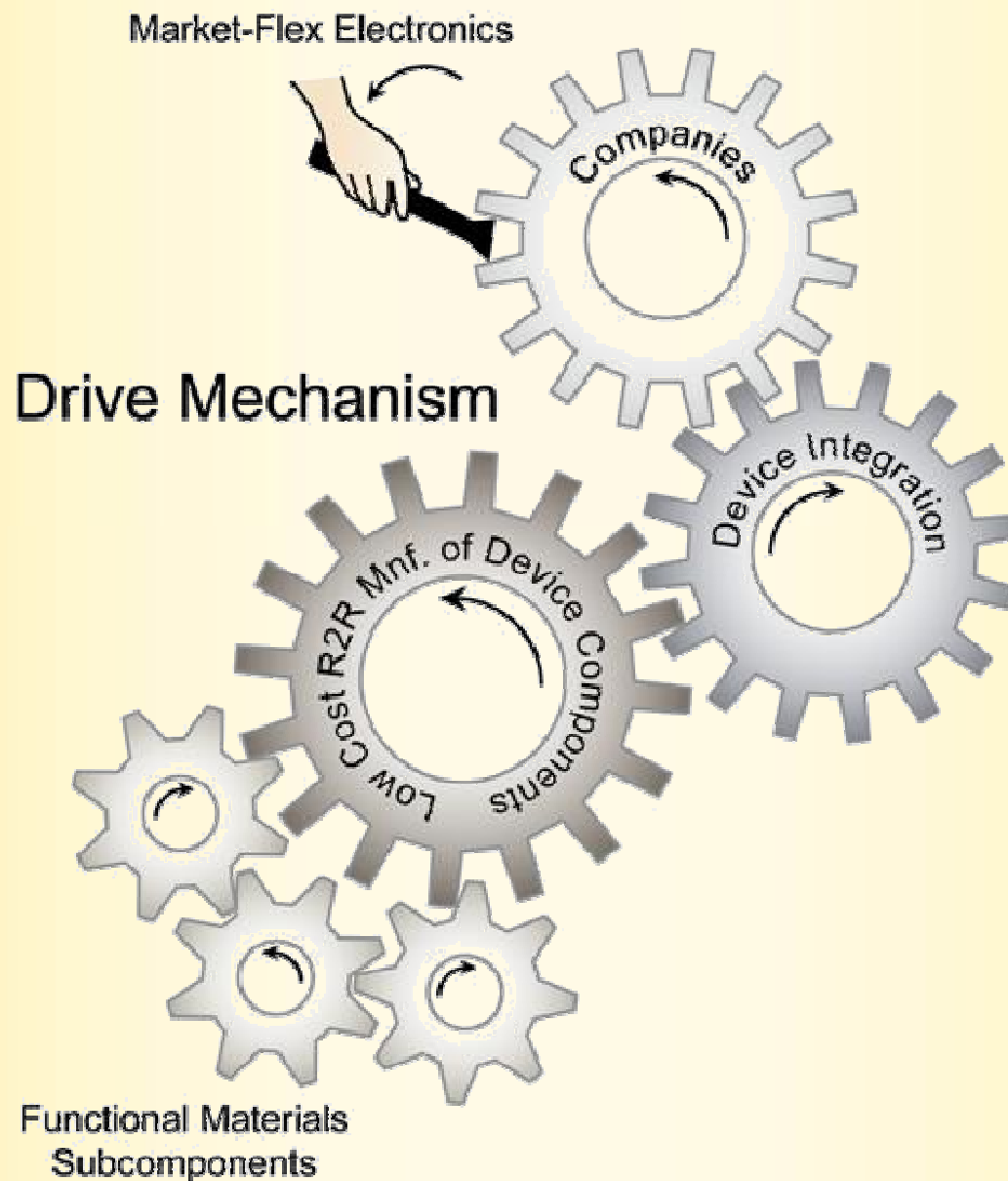
Stretchable electronic Implants



RFIDs



PATH TO COMMERCIALIZATION WITH POLYMER BASED FLEXIBLE ELECTRONICS



NEEDS

1. Materials

- Multifunctional low cost polymer films
(Flexible, transparent, conductive, reflective)
- Functional small molecules (Liquid crystalline ,conductive, Semiconductive, magnetic , piezoelectric)
- Photo functional materials for processing with light

2. Rapid Manufacturing Processes

- Roll- to roll
- Shaping- Thermoforming, Precision Molding, Printing
- Assembly processes- Lamination, Singulation ,Interconnects
- ..

3. Work Force Development Curriculum

U
A

The
University
of Akron

CASE WESTERN RESERVE
UNIVERSITY EST. 1826

KENT STATE
UNIVERSITY

BGSU



Functional Molecules
Nanoparticles

Liquid Crystals

Photochemicals

CHEMISTRY

Monomers/Polymers



ENGINEERING & R2R MANUFACTURING



The
University
of Akron

IN

OUTREACH-EDUCATION

OUT

Akron Polymer Training Center
Global Polymer Academy

DEVICE INTEGRATION (APS, KDI,
Alphamicon, Orbital Research...)





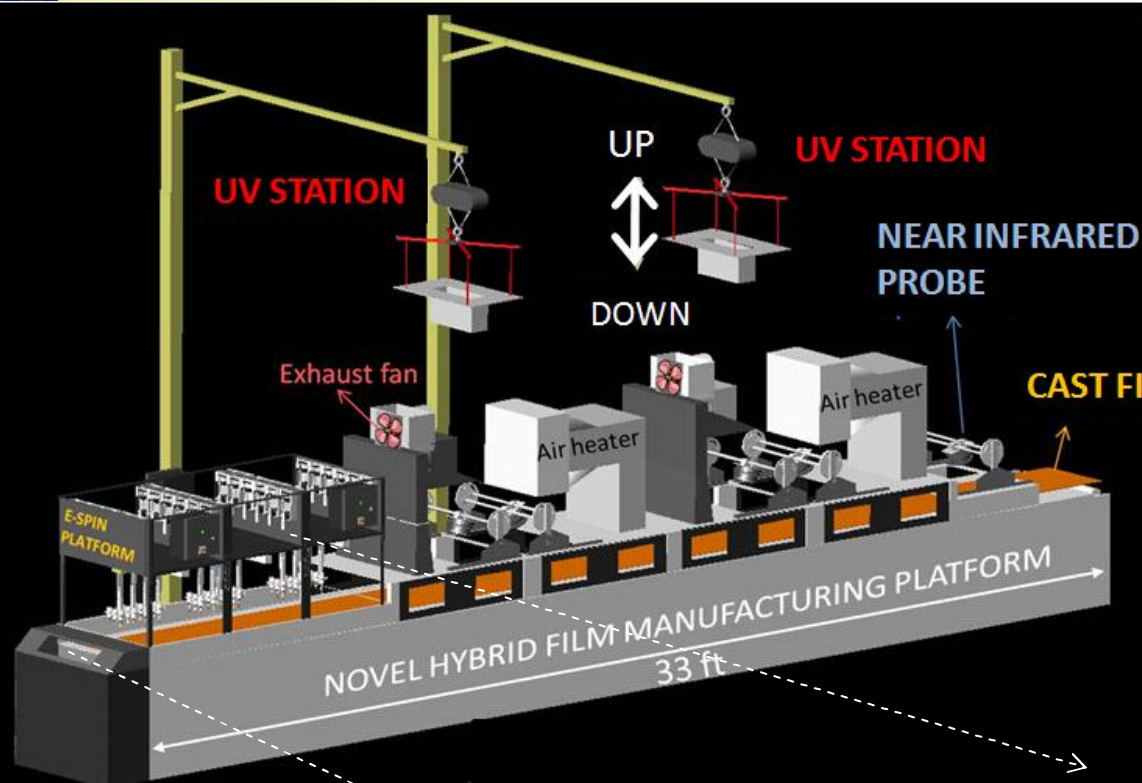
RECENT INVESTMENTS IN FLEXIBLE ELECTRONICS AT UNIVERSITY OF AKRON CAMPUS

NATIONAL POLYMER INNOVATION CENTER

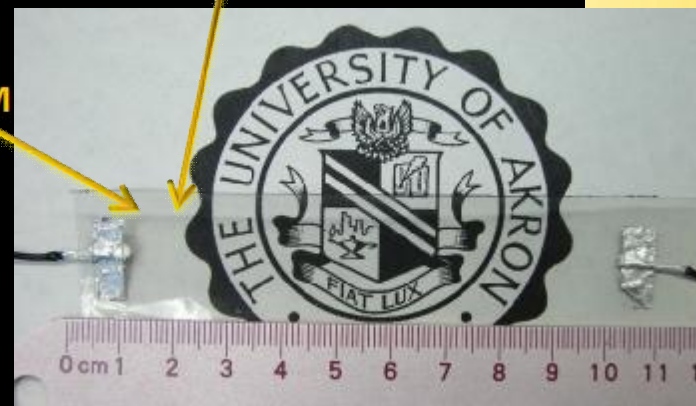




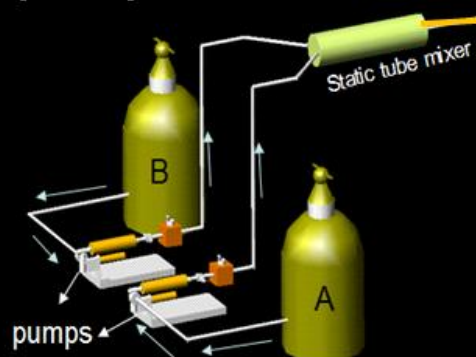
HYBRID FUNCTIONAL FILM PROCESSING LINE



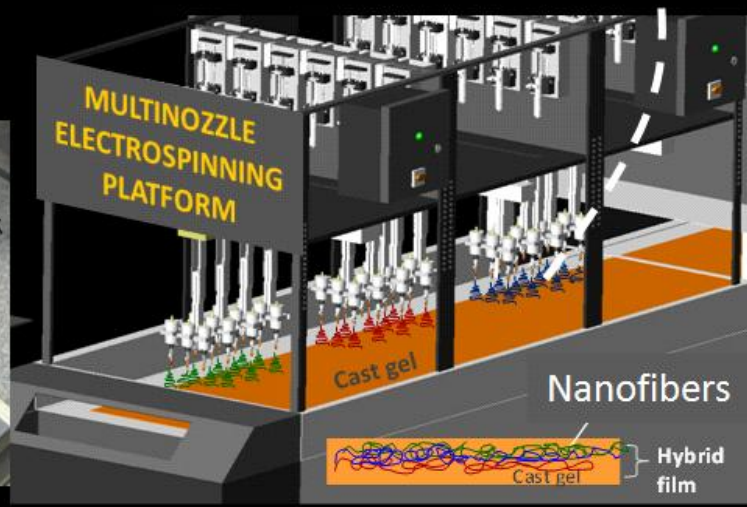
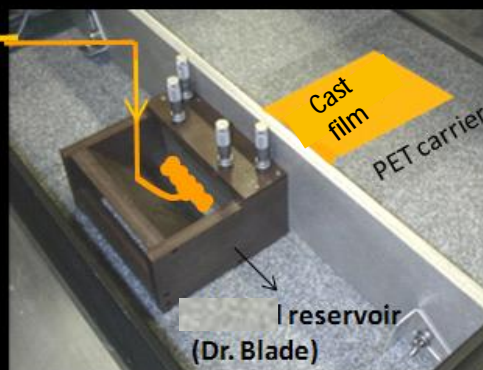
TRANSPARENT CONDUCTIVE FILMS
With Nanowires



SOLUTION DELIVERY
STATION



DOCTOR BLADE
ON HIGH PRECISION GRANITE





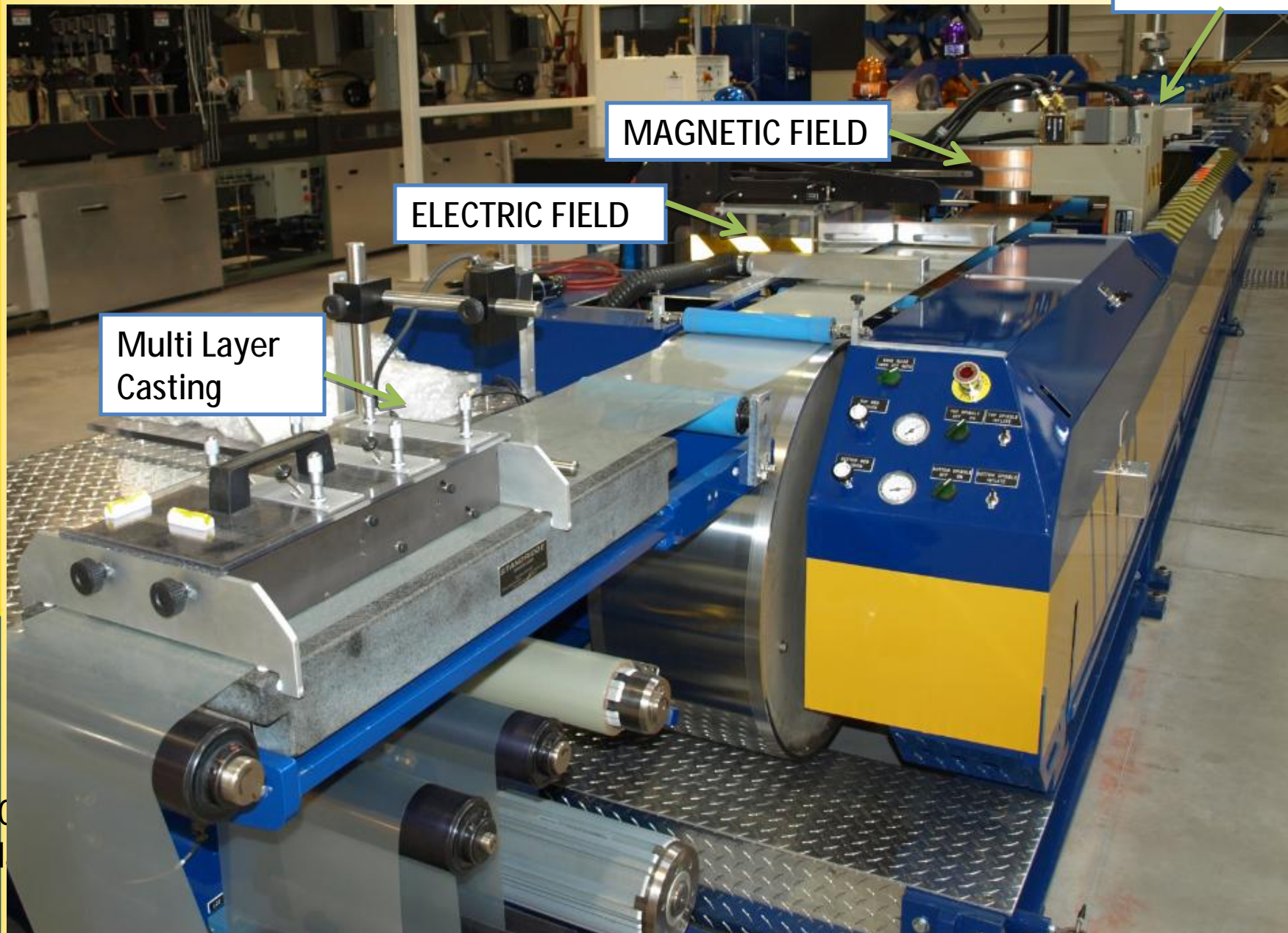
ELECTROMAGNETIC PROCESSING LINE

ZONE
ANNEALING

MAGNETIC FIELD

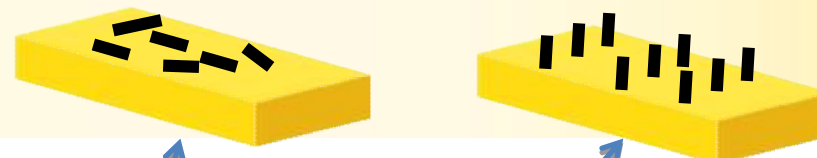
ELECTRIC FIELD

Multi Layer
Casting



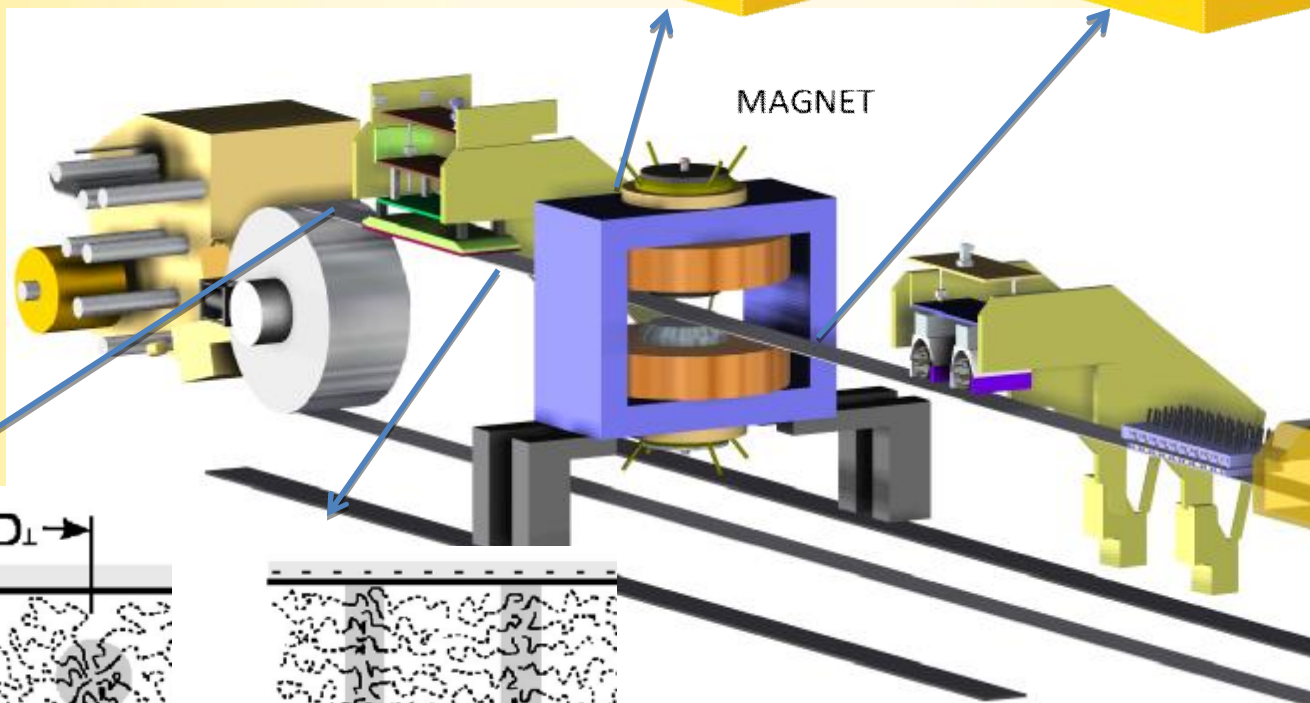
Z- Orientation via Electric and Magnetic Fields

MAGNETIC FIELD ALIGNMENT

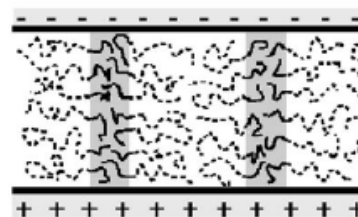
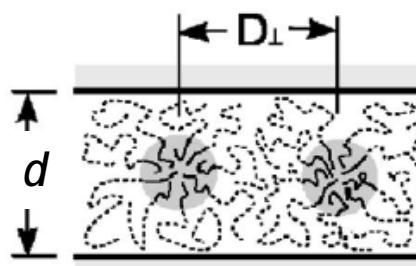


MAGNET

Start of process



End of process



ELECTRIC FIELD ALIGNMENT

Continuing Role of Regional Academic Institutions

- Work force development
Technician, BS, MS, PhD level scientist and engineers
- Identify and eliminate scientific and technological barriers to commercialization (Fundamentals of Materials , Processes, Modeling)
- Coordinate with partner industry and academic institutions

