

# A Pathway to the Development and Sustainability of CNC Machine Based Creativity by Initiating and Adapting to Meet People Demand: a case study of collaboration of Physics Department and Amaliyah Production in Banda Aceh City

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# Background



- We are located at small city with has difficulties to promote science and less demand on creative produce
- Less industrial company in small city in developing country and serious difficulties for physics alumni to implement their knowledge in physics.
- Most of research at physics department not meet need of local people interest.
- Most of Creativity is going down and no “support”.



# Physics Department and Workshop Laboratory

- Physics Department of Syiah Kuala University has strong tradition with wide spectrum of discipline in physics: Theoretical and Computation Physics, Solid State Physics, Biophysics/Nuclear Physics, Instrumentation, and Geophysics.
- In 1989 Physics Department established, 2005 participate in some workshop on CNC and 2006 CAD/CAM, in 2007 Workshop Laboratory established, and 2008 install CNC machine.
- We successfully create some products especially to support electronic panels, final work for students, and training.
- We have some plans for using the machine but we have obstacles to do many things in the physics department and also limited staff interest in the machine.



# Collaboration Physics Department and Amaliyah Production

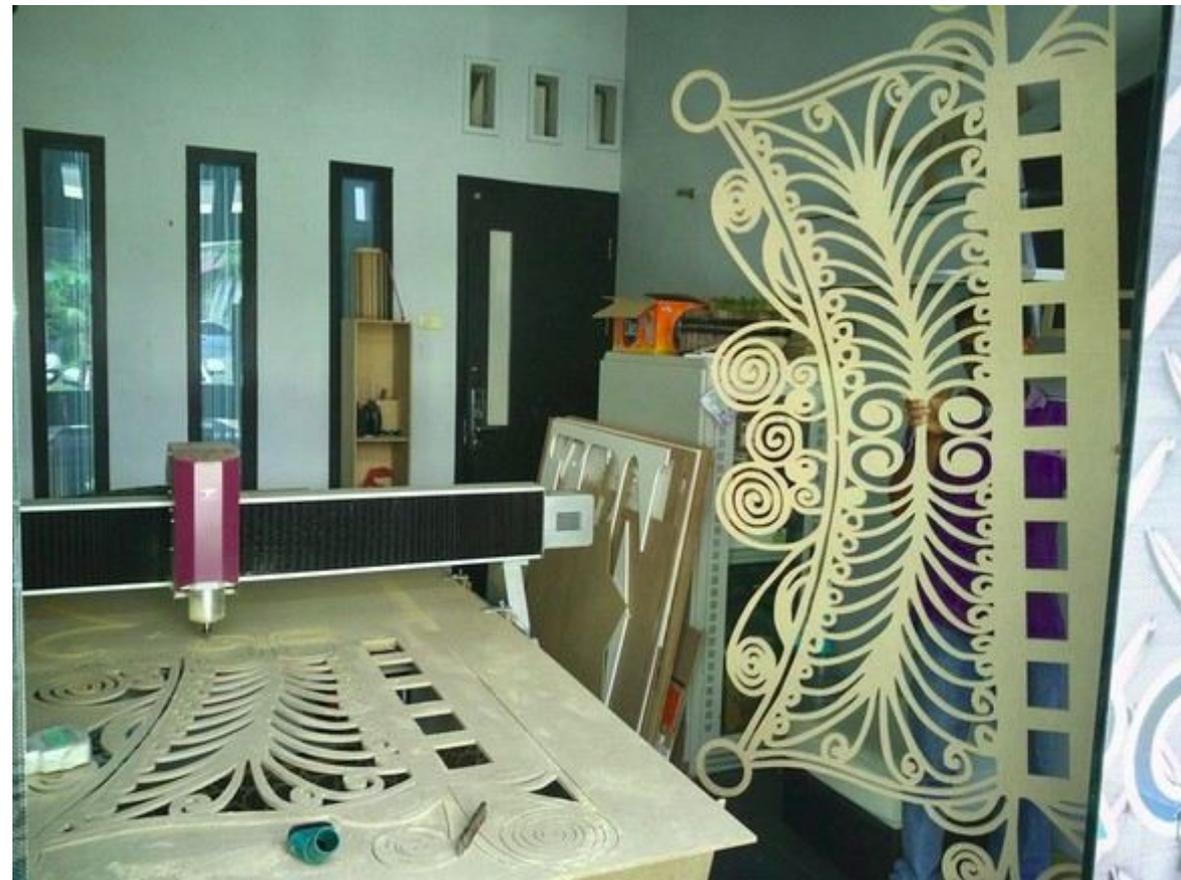
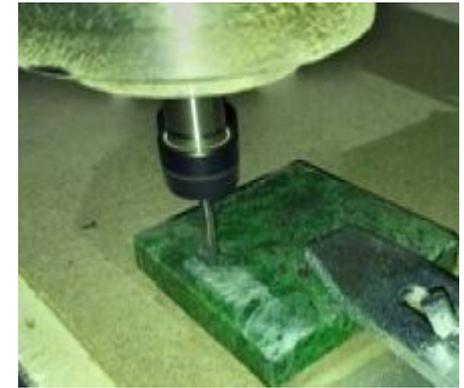
- The director of Amaliyah Production was a good and creative students in Physics Department and We have several activity related to Linux and Microelectronic.
- We serve Amaliyah Production for some project such as: mini model of laser security system, information technology solution, and smart house solution.
- Students internship for CNC Amaliyah Production and other collaboration.



# Workshop of Amaliyah Production



**CNC Router Kingcut X12  
and Ucancam V10**



# Amaliyah Production Creativity





# The Pathway Creativity in Physicists Department with Limited Demand and Funding

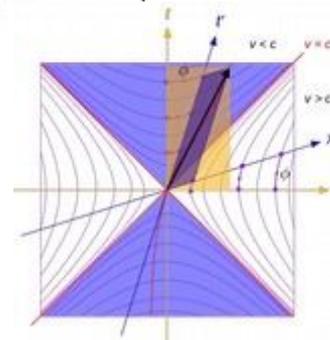
**Science**

**Art**

**Demand  
Hobby  
Educational**

Salary,  
Limited Fund

$$\begin{aligned}
 \begin{bmatrix} A_i \\ 1 \end{bmatrix} &= T_1 \begin{bmatrix} A'_i \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & q_x \\ 0 & 1 & 0 & q_y \\ 0 & 0 & 1 & q_z \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x'_0 \cos \theta_i - y'_0 \sin \theta_i \\ x'_0 \sin \theta_i + y'_0 \cos \theta_i \\ z'_0 \\ 1 \end{bmatrix} \\
 &= \begin{bmatrix} x'_0 \cos \theta_i - y'_0 \sin \theta_i + q_x \\ x'_0 \sin \theta_i + y'_0 \cos \theta_i + q_y \\ z'_0 + q_z \\ 1 \end{bmatrix} \quad (11)
 \end{aligned}$$



BOXS !!!! :(

**Wonder  
Innovation**

**New Market**

**Sustainability  
of Creativity**

# The Pathway of Amaliyah Production Company with large Demand Support (Peoples)

**Science**

*amaliyah production*

**Art**

**Creativity  
limited by  
current  
Technology  
product**

**Funding**

**Demand of  
Peoples**

**New Market**

**Wonder  
Innovation**

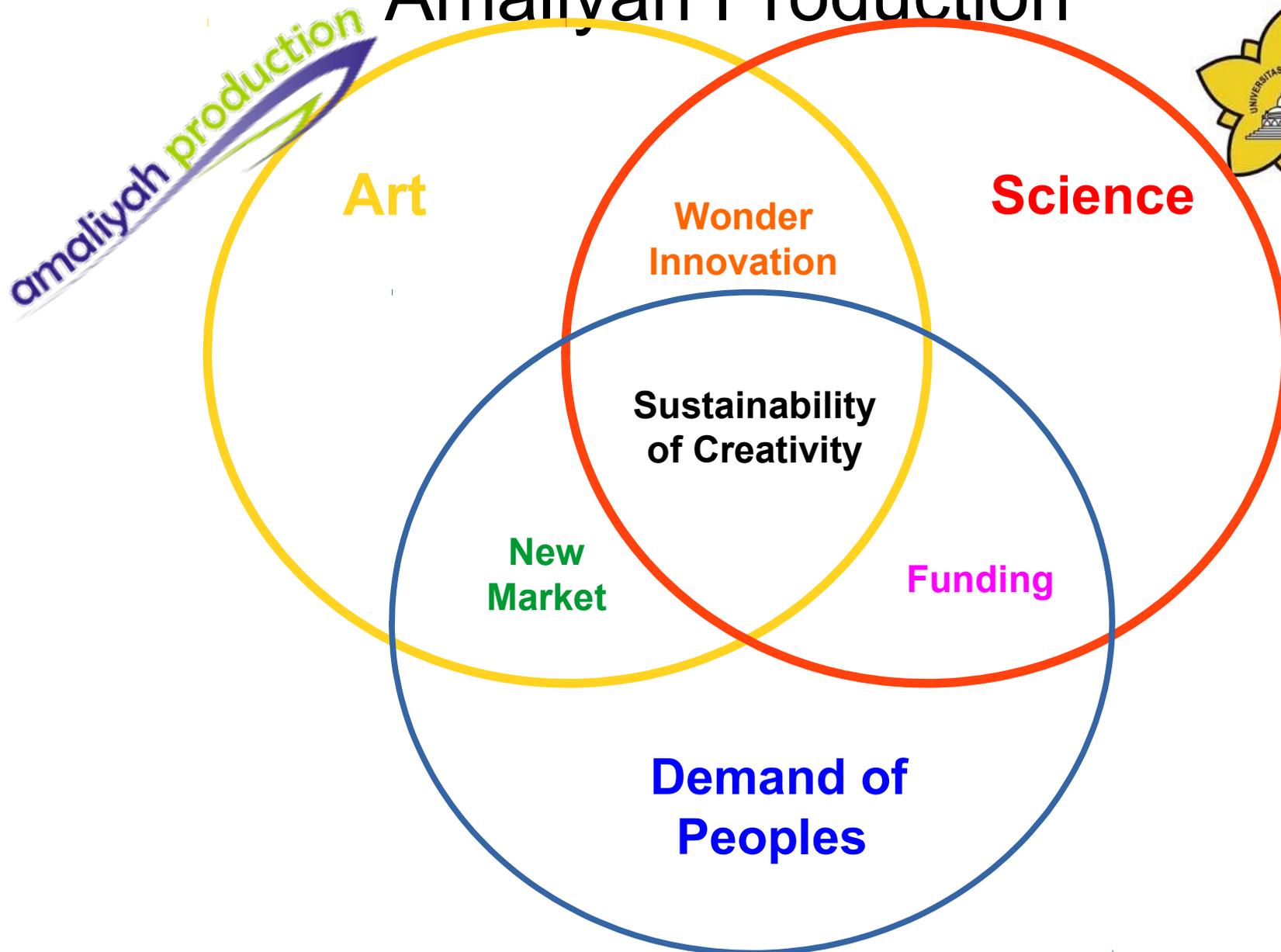
**Sustainability  
of Creativity**



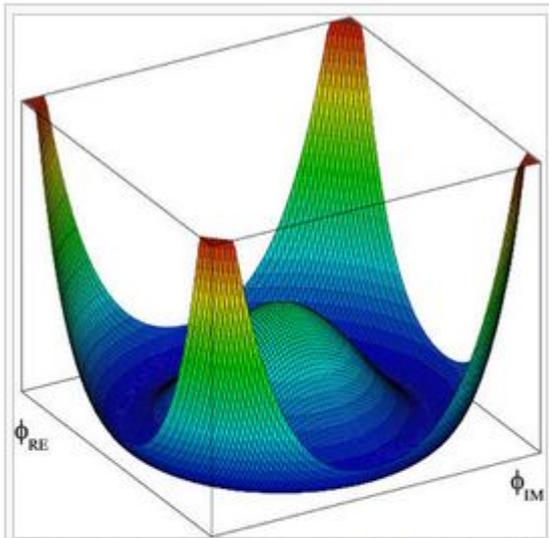
Appreciation from Mayor of Banda  
Aceh City 23 May 2015

# The Pathway of Sustainability Creativity

## Collaboration of Physics Departments and Amaliyah Production



# Thank to Fablab-ICTP

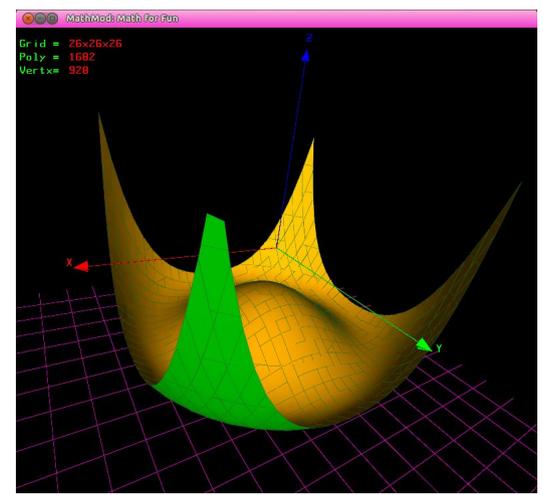


Higgs potential  $V$ . For a fixed value of  $\lambda$  the potential is presented upwards against the real and imaginary parts of  $\Phi$ . The *Mexican-hat* or *champagne-bottle profile* at the ground should be noted.

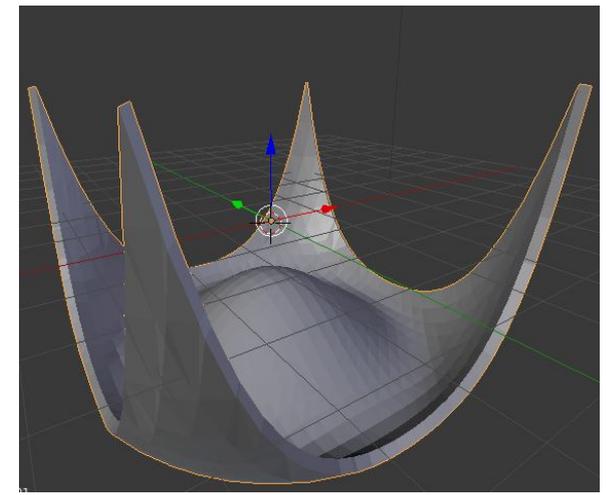
$$S(\phi, A) = \int -\frac{1}{4} F^{\mu\nu} F_{\mu\nu} + |(\partial - iqA)\phi|^2 - \lambda(|\phi|^2 - \Phi^2)^2.$$

$$(1-(x*x+y*y))^2-2*z$$

mathmod

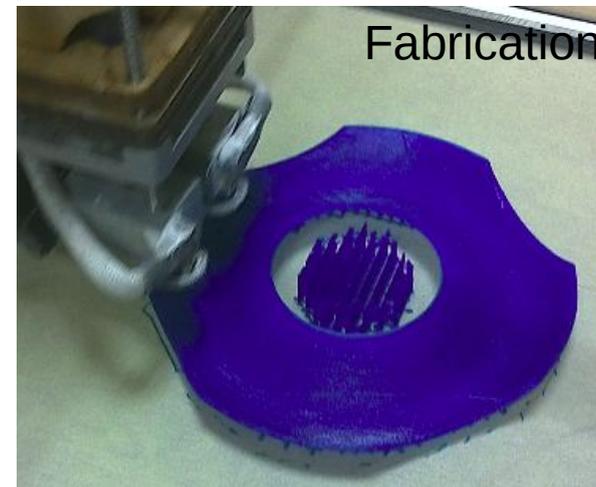
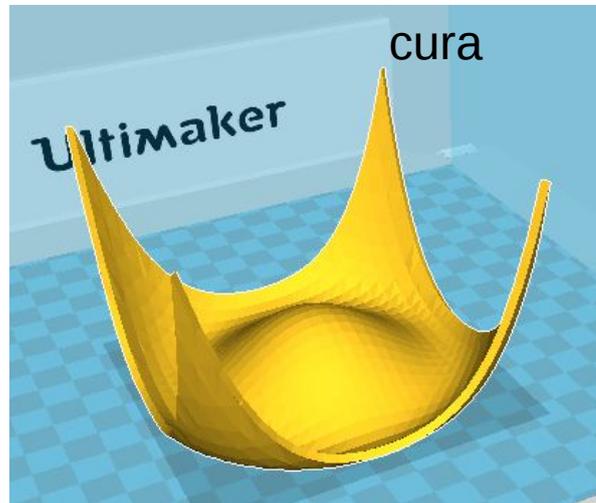


blender



[https://en.wikipedia.org/wiki/Higgs\\_mechanism](https://en.wikipedia.org/wiki/Higgs_mechanism)

3D reality product



# Conclusion and Suggest



- Physics Department in Developing Country has to sensitive with **local demand** to get suitability their funding and creativity.
- Physics graduations have opportunity to develop they knowledge in 3D product creativity.
- To establish Fablab in our department and joint the network to increase to activity (currently workshop lab).
- Promoting free software for CAD CAM.
- Design low cost homemade CNC for educational purpose by using available material our city.
- Keep physics tradition as source of innovation in developing country.

# Thank from Banda Aceh City to The World

