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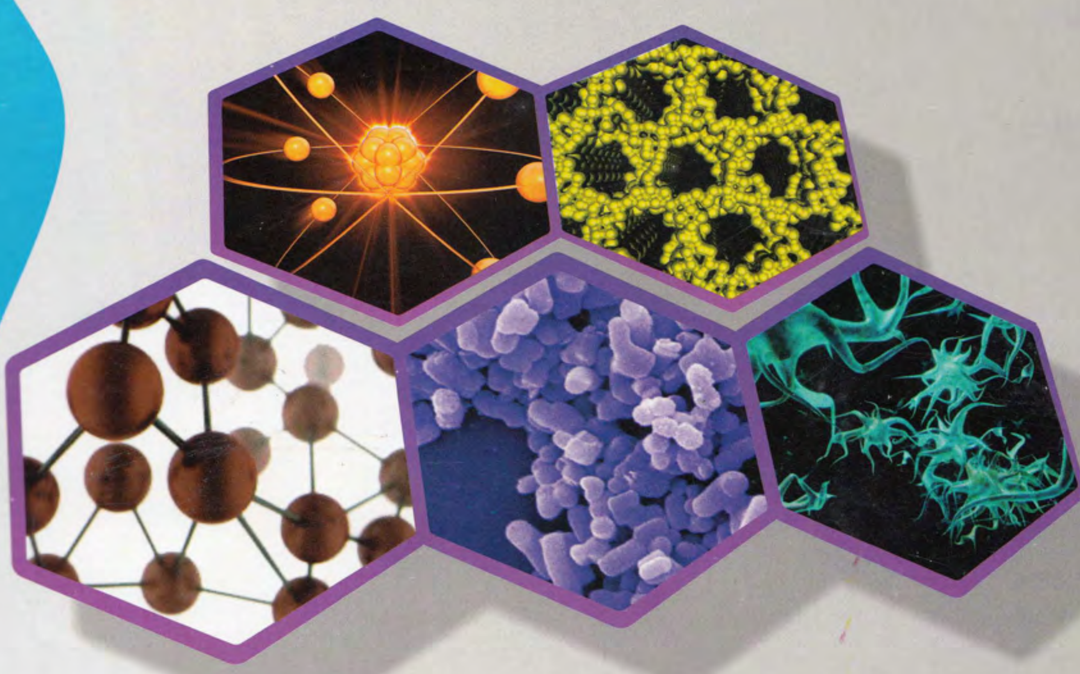
PROCEEDINGS

6th Kentingan Physics Forum

International Conference on Physics and Its Applications (ICOPIA)

The Future of Advance Materials, Nanoscience and Nanotechnology



Solo, October 3, 2012

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Kentingan Physics Forum
Physics Department, Sebelas Maret University
Surakarta, Indonesia

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Foreword

This current Kentingan Physics Forum (KPF) event is a celebration for twelve years of KPF since its first conference held at Novotel Hotel Solo in 2001. This biannual international conference on physics and its applications is dedicated to promote any advances and innovations in physics directly to society and provide the opportunity to foster international scientific networking and cooperation. Due to the hot issues of development of nanoscience and nanotechnology in around the world over ten years, the 6th international conference on physics and its applications focused to areas of advanced materials, nanoscience and nanotechnology. However, in order to accomodate other researchers, we also accept several topics during correlate to the physics and applied physics.

These proceedings contains papers presented at International Conference on Physics and Its Applications that held in LORIN Hotel Solo on October 3, 2012. All papers submitted to this conference have been reviewed. We received more than fourty four papers from universities and institutions including from Japan, Malaysia, and Thailand countries. Papers are organized in four areas gathering the different topics according to the scientific and/or technological approach: Material Physics, Geophysics, Theoretical and Computational Physics, and Instrumentation Physics and Acoustic. We hope that these proceedings will serve as a valuable reference for the students and researchers in the areas of advanced materials, nanotechnology, and nanosciences.

Chairman,

Dr. Agus Supriyanto, M.Si.

Contents

Geophysics and Acoustic

Theoretical, Computational and Instrumentation Physics

The Influence of a Stack Against The Distribution of Pressure on The Eco-Friendly Thermoaccoustic Resonator Tube

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ABSTRACT

The influence of a stack against the amplitude of pressure waves on the eco-friendly thermoacoustic resonator tube has been done. This research aims to determine the optimal length of the stack so that it doesn't interfere with the flow of air in the tube resonators. To find out the influence of pressure distribution of stack is done by way of reviewing a wave of pressure on different places in the tube. Pressure sensor used in the form of mini microphone. There are eight sensors has been located in eight different location.Two of which were placed near the stack. Length of stack consist of four variations that is 2 cm, 4 cm, 8 cm, and 10 cm. Pressure variations in the data displayed by the oscilloscope. The result is a stack has huge to pressure around stack while a place remote from a stack of its pressure little change. The length of a stack the most small have on the distribution of stresses is a long stack 2 cm. The conclusion that the optimal length among all variations are made is length stack 2 cm.

Keywords : pressure distribution, thermoaccoustic, sensor, stack

INTRODUCTION

Air conditioning systems such as air conditioner and cool storage for food ingredients for example fruits, meat, canned food, beverage cans, vegetables, and drugs really needed by tropical countries like Indonesia. Likewise for the purpose of export the results of agricultural production and farm of course need a cooling system and a good packaging so that when it comes to shipping destination, export products are still in a State of fresh. Generally air conditioning is still have deficiencies. One of the deficiencies that still use coolant which is eco-friendly, such as Chloro Fluoro Carbon (CFC). The effect that can lead to damage to the ozone layer in the Earth's atmosphere (strastofer) [1]. Damage to the ozone layer that can have an impact on the occurrence of global warming and climate change world. The negative effects of which could be caused by the life on earth as the increasing number of health problems and natural disasters. On the other hand, Indonesia had ratified the Montreal Protocol on substances the destroyer of ozone layer (Montreal Protokol on Substance that Deplete the Ozone Layer). Consequently, Indonesia is obliged to eliminate CFC and other ozone destroyer gradually. The Indonesian government committed to stopping imports CFC started 31 december 2007 [1]. Therefore a cooling system of eco-friendly alternatives need to be developed, one of which is the cooling thermoaccoustic. To produce optimal cooling in the thermoaccoustic cooling, airflow conditioned laminar [2]. The existence of the stack on the thermoaccoustic cooling resonators can be a hindrance in the transfer of heat that can change the shape of the air flow in tube resonators from laminar to turbulence. So, in order that the presence of stack does not interfere with the length of the stack must be made as fully as possible. The goal will be reached in this research is to figure out the optimal length of the stack so that it doesn't interfere with the flow of air in the tube resonators.

EXPERIMENTAL

The arrangement of the measurement of the distribution of stresses on the eco-friendly thermoaccoustic resonator tube presented in figure 1.

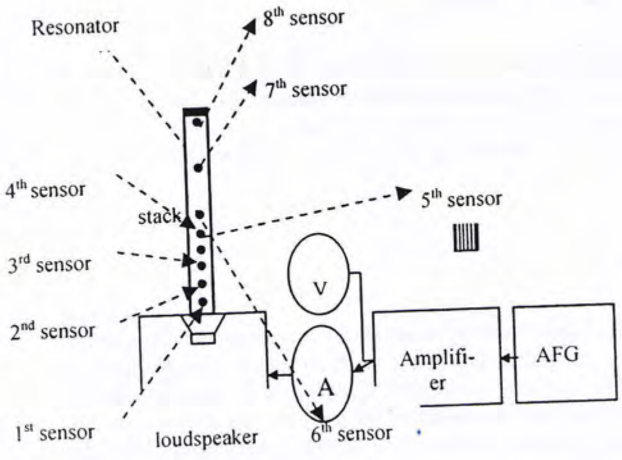

Figure 1. Setting pressure distribution measurement tools in thermoaccoustic cooling resonators tube

Audio Function Generator (AFG) serves as a power station frequency. Frequencies used in this research equal to 100 Hz. Amplifier serves to strengthen signals AFG. Voltmeter and Ammeter for measuring current and functioning voltage input. In this research the current and voltage inputs are used, each 0.18 A and 1.2 V. Loudspeaker function to convert an electrical signal into sound signals. Tube resonators serve as scene of resonance wave sound. Stack function to the heat transfer [3]. 1st up to 8th sensors be functioning mini microphone to measure pressure distribution. Pressure distributions can be seen from the pressure wave, while the pressure wave associated with the wave phase shift [4]. Outer expected of this research is procures long optimal stack to prevent the flow of air in a tube resonators. An indicator of success is obtained data pressure as a function long stack.

RESULTS AND DISCUSSIONS

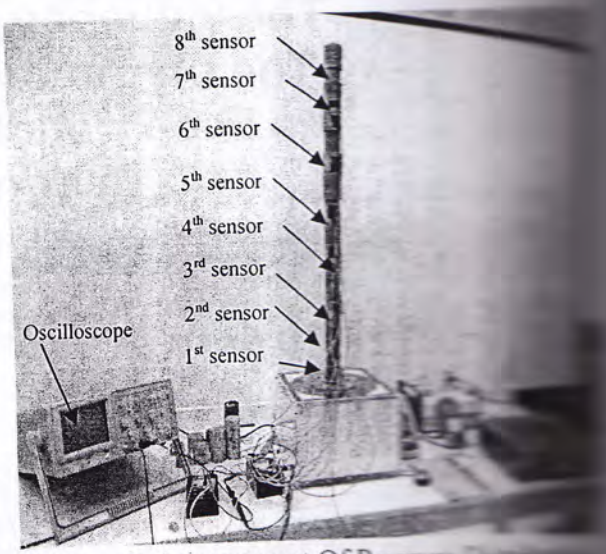

Figure 2. Arrangement Of Pressure Distribution Measurement devices

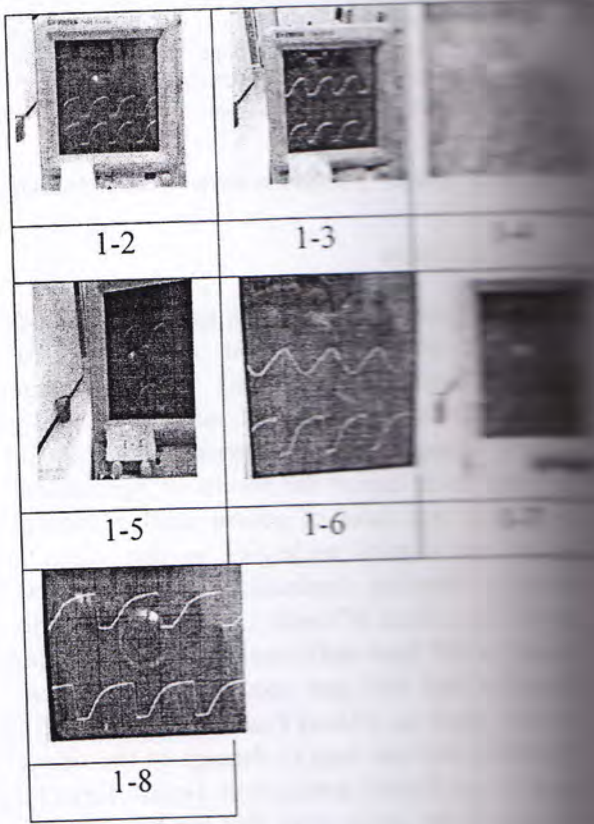

Figure 3. The result of a photograph ... waves without a stack

The arrangement of the instrument ... Figure 3. Pressure distribution ... measured with 1st up to 8th sensors. ... the reading of the pressure distribution ... early oscilloscopes. Next the data ...

camera so that the data obtained in the form photographs as in Figure 4. Lastly, the image a is processed so that retrieved graphs. Dission of influence of pressure distribution of ck is done by means of comparing the distriion of pressure on the tube resonator without ck to pressure tube resonators at the moment en the stack with the size of 2 cm, 4 cm, 6 cm 10 cm. The visual image of the comparison ll can be seen in Figure 4.

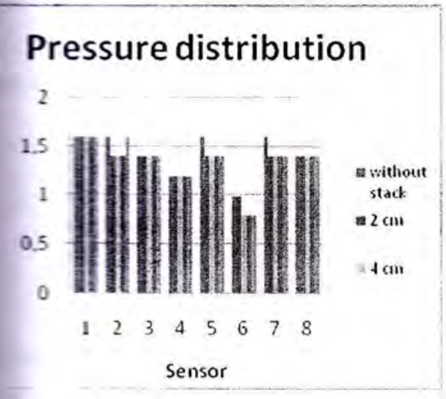

Figure 4. A graph the influence of a stack inst the distribution of pressure at some point which will be reviewed

sed on Figure 4 may be known that pressure the sensor to the sensor to 3, 1, 4, and sensors sensors to 8 are not affected by variations in stack. This can occur because the sensors is ced far enough to stack. While 2nd sensor, 5th sor, 6th sensor and 7th sensor affected by the ck. 2nd sensor,5th sensor, 6th sensor and 7th sor of the affected sensor stack due to its fairclose to the stack. The 2nd sensor though far affected by the presence of a stack. Thus it be stated that the existence of a stack either 2 cm, 4 cm, 6 cm and 10 cm affects the prese in the area around the stack and a small part an area far from the stack. Next to know the luence of long stack the most small to prese can be seen from 6th sensor and 7th sensor a sensor closest to stack. 6th sensor is a sensor the decreasing temperatures while 7th sensor he location of the increase in temperature [5]. sed on Figure 4 can be known that at length ck 6th sensor (2 cm) having pressure equals hout stack while other different length stack. ile to the censorship of 7 all variation long ck having different pressures with pressure without a stack. Thus the influence of length of the stack to the smallest pressure distribution is 2 cm length stack.

CONCLUSION

A conclusion that obtained from this research is a stack has huge to pressure around stack while a place remote from a stack of its pressure little change. As for the length of the stack of the least influence on the distribution of pressure is 2 cm length stack. Thus the optimum length of all created variations is the length of the stack 2 cm.

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