

CALIFORNIA STATE SCIENCE FAIR

2001 PROJECT SUMMARY



Your Name (List all student names if multiple authors.)

Deborah S. Dossick

Science Fair Use Only

S1406

Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9)

Contrast in Radiography

Division

S Junior (6-8) S Senior (9-12)

Preferred Category (See page 5 for descriptions.)

14 - Physics & Astronomy

Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.)

Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.

OBJECTIVE: To study the contributions of kilovoltage potential(kVp), current(mA), and exposure time toward the development of contrast in radiography.

MATERIALS & METHODS: Using a model I developed of the simulated components of the human body with commercially available bone, muscle, fat & water, as well as the surrounding air, I systematically adjusted the kVp, mA, and exposure time on the control console of a radiographic unit, studying how optimal contrast is achieved.

RESULTS: 1) The mathematical product of mA and exposure time, known as mAs, is directly proportional to the "quantity" of x-rays. 2) For a given mAs, relatively smaller mA enriches the radiographic contrasts and borders. 3) Contrast results from optimal balance of both kVp ("energy" or penetration) and mAs ("quantity").

CONCLUSIONS: Without appropriate understanding of the variables that create radiographic contrast, images appear homogeneous, being either underexposed or overpenetrated, failing to yield desired diagnostic information. My simulated model helped me demonstrate the roles that both the energy and the quantity of x-rays play in the art of taking pictures with gamma irradiation.

Summary Statement (In one sentence, state what your project is about.)

Experimental model to study the variables contributing to radiographic contrast.

Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4.

My father provided the use of a radiographic suite and some reading materials.