

# Fluid Material with Interaction

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## 1 Introduction

Material rendering has been considered very important in computer graphics. Real world materials have vast varieties of physical characteristics, thus makes pure computer simulation challenging and exciting.

Successful models for rendering various materials include translucent materials, fluid, fabric, sand, etc. Andre et al. has provided an excellent model for the simulation of porous sand and water mixture. (Here put some other examples).

While recent development has made it possible for computers to simulate real world materials with a rather high performance, the process of rendering is considered to be heavily reliant on computational powers.

We propose a novel method to enhance user experience with digital devices. Though current game engines have been proven to be very powerful for development and deployment, there has been very few topics on making digital and real images seamless at runtime. Our proposed method provides an augmented reality interface for people to interact with wet sand in virtual space. By providing prerendered information for virtual devices, we will be able to greatly increase CG effect on handheld devices, such as iPhone.

## 2 Targets

Major challenges in our proposed method are:

- Rendering of materials on a mobile device
- Interfacing with virtual materials
- Assessment

As mentioned

Figure 1: AR/VR, Wet Sand Simulation

### 3 Filters, exposures, and special requests

Assuming that the best telescope for your work is one of the two 0.5 meters (CDK20N at Moore Observatory, CDK20S at Mt. Kent), you will have a choice of filters: Sloan filter set (g, r, i, or z), Johnson-Cousins (U, B, V, R, or I), color imaging (B, G, R, or clear), and narrow band (S [II], red continuum, H $\alpha$ , O[III]). Identify which filters are of interest.

A typical exposure time for a magnitude 12 star to about half saturation is 100 seconds, but it depends on the filter choice. Based on this, estimate how many exposures you will need, and what total time you require. In some cases, for example studying an eclipsing or variable star, or an exoplanet transit, you would use only one filter and make many measurements over a night. In others, you may make only a few exposures in each filter, and try many different filters. Changing filter sets takes an operator and several minutes, but changing filters within one set (e.g. a different Sloan filter) takes only a few seconds.

We have other telescopes that may be available at Moore Observatory this season. There is a wide field astrograph that has a field of view of 4° and is a fast  $f/4$ , especially good for large nebula, comets, or surveys. A 14-inch (0.36 meter) Celestron telescope can be equipped with a fast camera for planetary imaging. A 27-inch (0.7 meter) corrected Dall-Kirkham is scheduled to be delivered to Australia this fall, although we are unsure of the actual date it could see light yet.

### References

- [1] Jonay I. González Hernández, Pilar Ruiz-Lapuente, Hugo M. Tabernero, David Montes, Ramon Canal, Javier Méndez and Luigi R. Bedin, No surviving evolved companions of the progenitor of SN1006, *Nature*, **489**, 533-536 (2012).