Where is Here?

Astrolabes for use on Mercury,
Venus, Mars … and even Pluto

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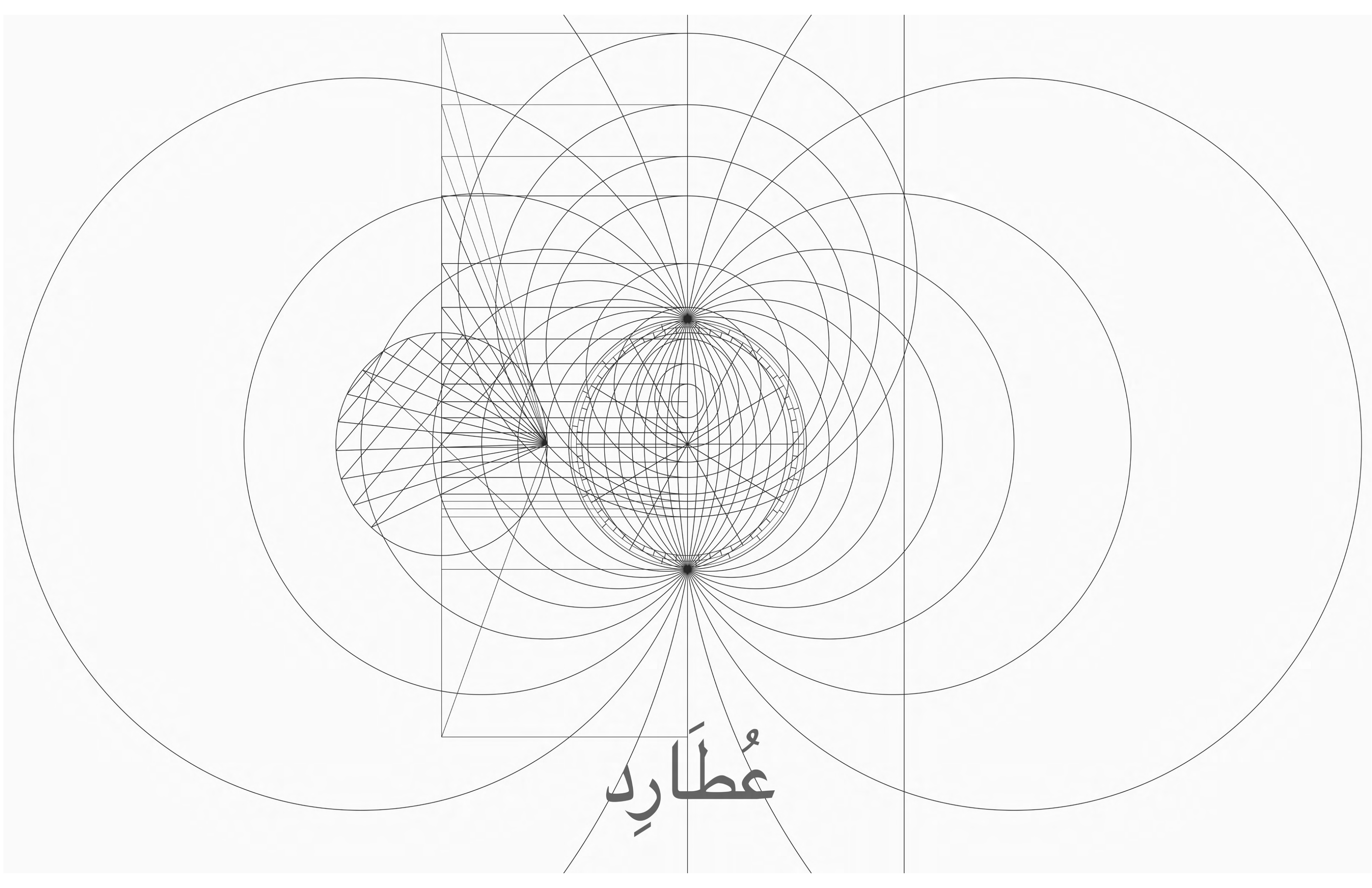
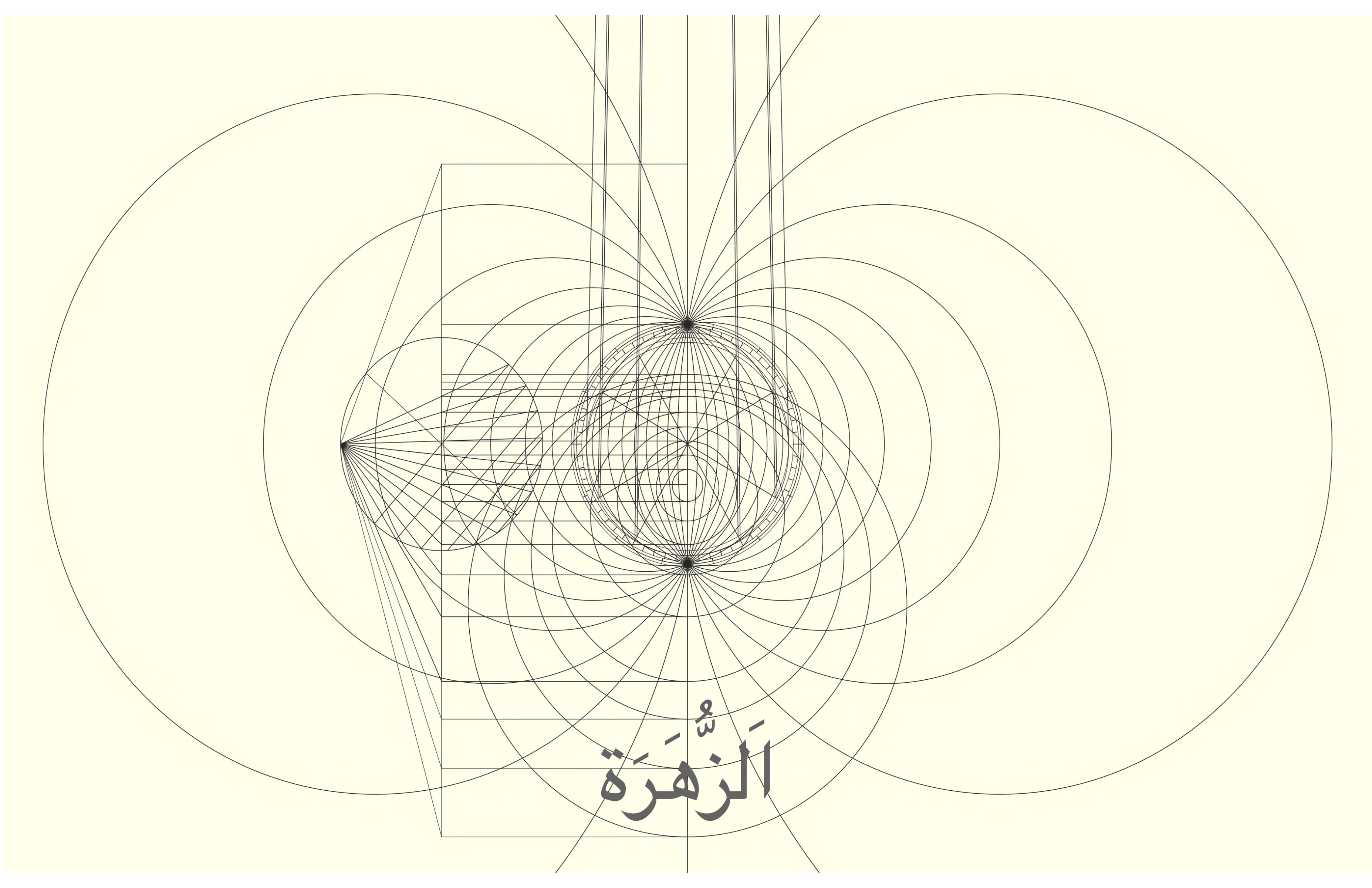
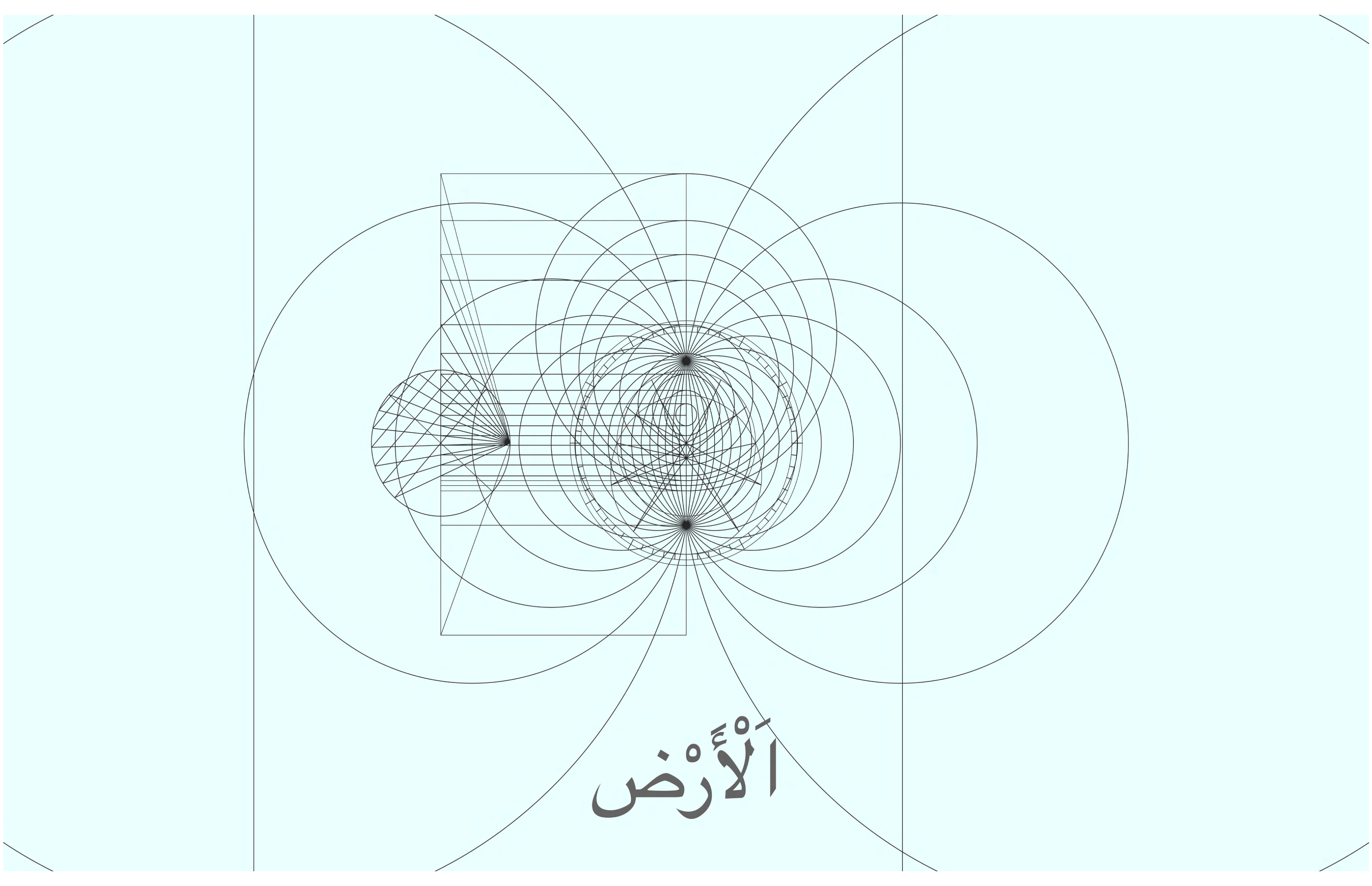


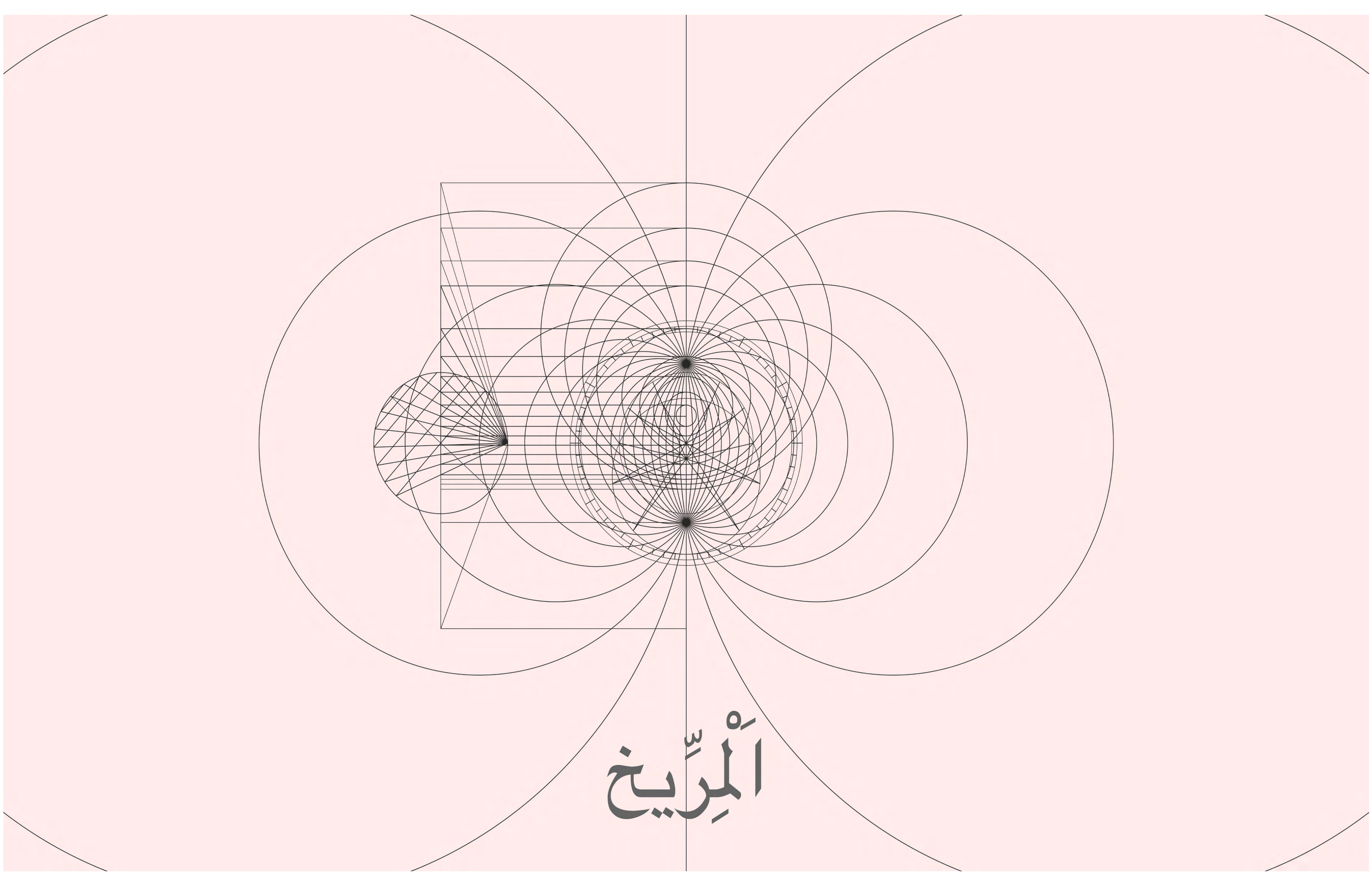
MERCURY



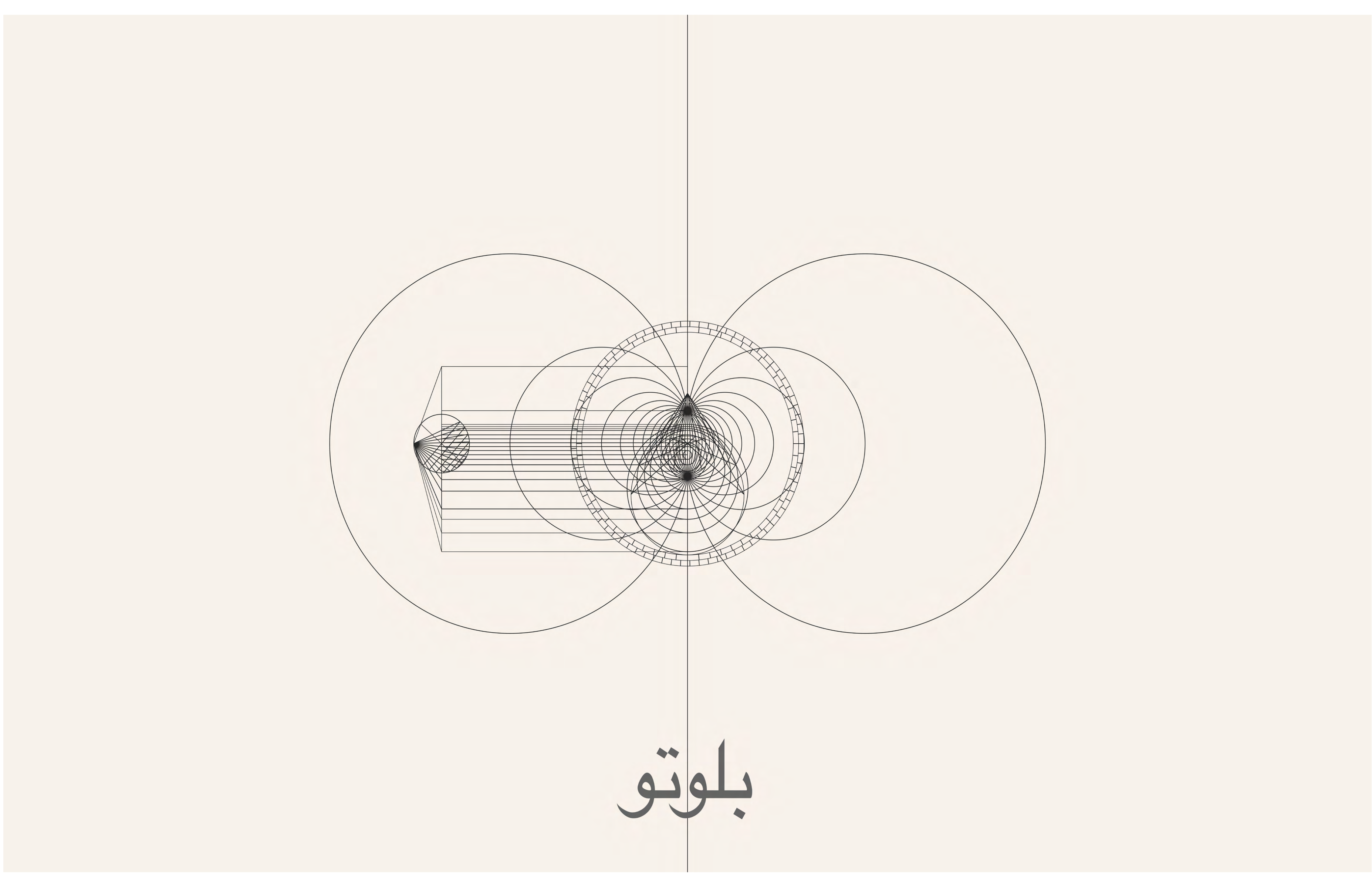
VENUS



EARTH



MARS



PLUTO

An astrolabe (Arabic: ٱلأَسْطُرلاب) is an intricate inclinometer employed by ancient astronomers and navigators to measure the altitude of a celestial body above the Earth's horizon. Utilized during the Islamic Golden Age, the European Middle Ages, and the Age of Discovery, it served as a handheld model of the universe, identifying the stars and planet as well as measuring the latitude, determining the time, and estimating the height of distant objects.

The first universal astrolabe was invented by the Islamic scholar Abu Ishaq Ibrahim al-Zarqali (b. 1029). Unlike its predecessors, his 'Tablet of al-Zarqali' projected both the equatorial and ecliptic coordinate systems on a vertical plane that cut the celestial sphere at the solstices, permitting its use at any latitude on Earth.

Inspired by al-Zarqali, I drew construction lines to create astrolabes for use on each of the eight planets and Pluto, appending his trigonometry calculations with contemporary NASA data and JavaScript. Latitude was set at 39.8628° N, matching that of Al-Zarqali's birthplace in Toledo, Spain. Variation between the digital drawings results from each planet's unique obliquity to orbit in addition to their distinct rotational and orbital periods.

	MER	VEN	EAR	MAR	PLU
Obliquity to Orbit (degrees)	0.034	177.4	23.4	25.2	119.5
Rotational Period (Earth hours)	1,408	-5,832	23.9	24.6	-153.3
Orbital Period (Earth days)	88.0	224.7	365.2	687.0	90,560

My curiosity was sparked by the projection effect, the observational illusion caused by viewing distant objects from a particular perspective. I wondered whether an astrolabe could also provide navigational and temporal orientation on the other planets of our solar system? Yes, these sketches affirm the ability of al-Zarqali's ingenious instrument to cross space and time and guide future exploration of our neighbors. Even Pluto!

I made the multi-planet astrolabe series during my postgraduate studies at MIT in Dr. Elizabeth Cavicchi's course EC.090 'Re-create Experiments from History: Inform the Future from the Past.'

I'm grateful for your interest in viewing my work and invite you to share the sketches with others who also possess a passion for historical scientific instruments, astronomical art, and/or exploring Pluto.