


History Of Ilmu Falak in *Madura*

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Article Info	ABSTRACT
<p>Article History Received Revision Accepted</p>	<p>Islamic Astronomy, or Ilmu Falak, is a vital branch of Islamic science that helps determine the times for worship, including prayer, fasting, and holidays. In Madura, this discipline has deep roots in the tradition of Islamic Boarding Schools (pesantren). This study explores Ilmu Falak's historical development within these institutions, focusing on its historical context, institutionalization, teaching dynamics, and the interplay between religious leaders, Islamic Boarding Schools, and the community regarding Falak knowledge. Employing a qualitative descriptive approach and library research methods, this study draws on both primary and secondary literature related to Ilmu Falak in Madura. The findings indicate that Ilmu Falak was first introduced in Madura by the religious leader Ahmad Dahlan at Al-Karawi, subsequently spreading to other Islamic Boarding Schools. Although not part of the formal curriculum, practices such as Hisab (calculation) and rukyat (sighting) are maintained through the authority of religious leaders and the religious activities of the pesantren. The institutionalization of ilmu falak is evident in the presence of semi-formal institutions and non-classical teaching methods. Furthermore, the adoption of modern falak technology, including applications and telescopes, demonstrates an adaptation to contemporary needs. The local community tends to follow the decisions of religious leaders over governmental directives, reflecting their respect for the authority of the Islamic Boarding Schools. Consequently, ilmu falak in Madura transcends mere worship; it is intricately woven into the social and cultural fabric of the pesantren, continuing to thrive and evolve.</p>
<p>Keywords: Ilmu Falak Islamic Boarding School Religious Leaders</p>	
	

I. Introduction

Ilmu falak, often referred to as Islamic astronomy, is an integral part of the Islamic scientific tradition and has played a central role in shaping religious life and intellectual pursuits within Muslim societies. At its core, ilmu falak is concerned with the study of celestial bodies and their movements in relation to the Earth, serving not only as a scientific discipline but also as a practical guide for the religious obligations of Muslims. Its applications are most directly observed in the determination of prayer times, the precise onset of fasting during Ramadan, and the sighting of the new crescent moon (hilal) [1] To mark the beginning of Islamic months, and the establishment of major holidays such as Eid al-Fitr and Eid al-Adha.

Historically, the development of ilmu falak in the classical Islamic world cannot be separated from the broader history of science. The discipline flourished through an intellectual synthesis that brought together Greek astronomical models, Indian mathematical techniques, and Persian observational traditions. Muslim scholars did not merely transmit this knowledge; they refined, critiqued, and expanded it within the framework of Islamic epistemology, integrating empirical observations with a worldview grounded in revelation and theology. This process of adaptation and innovation transformed ilmu falak into a uniquely Islamic science that both preserved earlier knowledge and generated original contributions to the global history of astronomy.

Beyond its practical function in regulating religious rituals, ilmu falak reflects the intellectual vitality and scientific curiosity of Muslim scholars from the Middle Ages onward. Their work in fields such as spherical trigonometry, geometric astronomy, and the construction of sophisticated instruments—like the astrolabe and quadrants—demonstrates how deeply interconnected science, mathematics, and religious practice were in Islamic civilization. Observatories established in places such as Baghdad, Maragha, Samarkand, and later Istanbul became centers of cutting-edge astronomical research, influencing both the Islamic world and, eventually, the European Renaissance.

In Indonesia, ilmu Falak has undergone a long process of adaptation and acculturation. One of the areas that became a destination in the spread and development

of ilmu Falak is Madura Island. Madura is not only known as a strong base of Salaf Islamic Boarding School, but also as a region with a prominent scientific tradition. Several Islamic Boarding Schools in Madura, such as Annuqayah (Guluk-Guluk, Sumenep), have made a significant contribution to reviving falakiyah studies within the Islamic Boarding School community [2].

Not only is Islamic Boarding School Annuqayah known for its consistency in developing Falak science, but there are also other Islamic Boarding Schools in Madura that play a role in preserving and teaching this discipline. Al-Mubarak Islamic Boarding School in Lanbunan Sampang, for example, actively teaches ilmu falak to its students through regular study forums and applies hishab-rukyat practices[2]. Meanwhile, Al-Karawi Islamic Boarding School also has a reasonably strong Falak literacy, although its teaching is more exclusive and is not directly transmitted to general students. This condition reflects the variation in the pattern of institutionalization of ilmu Falak between Islamic Boarding Schools, both in terms of teaching methods, scientific orientation, and preservation strategies in the midst of the challenges of the times.[3]

Islamic boarding schools, as traditional Islamic educational institutions, have played a central role in preserving and transmitting the knowledge of ilmu falak for generations. This scientific transmission is not only textual, as seen in the study of classical falak books such as Irsyad Al-Murid, al-Dûrr al-Anîq (by K. Ghazali, Caretaker of Lanbunan Islamic Boarding School),[4] but also takes place practically through training in hisab, rukyat, and the creation of the lunar calendar. This tradition has continued even into the modern era, where some Islamic Boarding Schools have begun to integrate the classical Falak approach with digital technology tools and modern astronomical applications.

However, there have been few scientific studies that specifically trace the historical and institutional development of Ilmu Falak in the Madura Islamic Boarding School. Most Falak studies in Indonesia are still focused on the western and central parts of Java, while the eastern regions, such as Madura, often go unnoticed. In fact, historically

and culturally, Islamic Boarding Schools in Madura have strong roots in the formation of an independent and innovative falakiyah tradition.

II. Method

This research employs a descriptive qualitative approach, utilizing the library research method as the primary data collection technique. The focus of the study lies on tracing the development of ilmu Falak in several Islamic boarding schools in Madura through a review of various literature, both primary and secondary, such as classical Falak books, written works of students and Religious leaders of Islamic boarding schools, as well as scientific publications related to the history and dynamics of ilmu Falak in the Islamic Boarding School environment. The data were analyzed historically and contextually to understand the transmission patterns, the development of teaching methodologies, and the distinction between Islamic Boarding School institutions in managing the falakiyah tradition. Data validity is strengthened by triangulating authoritative and relevant literature sources within the framework of Islamic studies, Islamic Boarding School education history, and ilmu falak.

III. Results and Discussion

A. History of Ilmu Falak in the Islamic Boarding School Madura

The development of ilmu Falak in the Madura Islamic Boarding School environment cannot be separated from the local dynamics of Islamic science, which rests on the authority of Islamic Boarding School ulama as bearers, guardians, and innovators of classical scientific traditions. In this context, Al-Karawi Islamic Boarding School can be considered an early pioneer in the introduction and development of astrology in the Madura region. It is at least evidenced by the existence of a central figure in the early history of Madura falakiyah, namely Religious leader Ahmad Dahlan, the caretaker of the Al-Karawi Islamic Boarding School, who first introduced falak through hisab. The hisab method, introduced by Religious leader Ahmad Dahlan to the next generation, is noteworthy. It was motivated by Ahmad Dahlan's disappointment with the rejection of rukyat, as he reported. Another factor that motivated Religious leader Ahmad Dahlan to switch from the rukyat method to hisab was that the location of the rukyat at that time was relatively far from the village of Karay. Religious leaders Ahmad Dahlan married

Nyai Khairiyah and had 11 children (7 sons and 4 daughters), namely Nyai Sa'diyah, Nyai Saidah, Religious leaders Muhammad Imam, Religious leaders As'ad, Religious leaders Ahmad, Religious leaders Muhammad, Religious leaders Ma'mum, Nyai Barakah, Nyai Zulfah, Religious leaders Wajih, and Religious leaders Hammad. Religious leader Ahmad Dahlan died after Indonesian independence, but the year of his death is not known for sure.[3]

Although he did not systematically teach it to general students, Ahmad Dahlan, a religious leader, is known as a figure who mastered ilmu falak in depth and became a scientific reference in the limited circle of Religious leaders and Islamic Boarding School intellectuals of his day. The tradition of falak at Al-Karawi is latent, kept in an exclusive circle, but it has a significant influence on the legitimization of ilmu falak in Madura.

Then, the baton of development of ilmu falak continued to Al-Mubarak Islamic Boarding School, Lanbulan, Sampang, under the care of the Religious leader Ghazali. Unlike the pattern at Al-Karawi, at Al-Mubarak, ilmu Falak began to be taught openly to students. This transformation marked a shift from elitist to populist Falak in the Islamic Boarding School environment. Religious leader Ghazali became a key figure in modernizing the teaching of Falak in Madura, primarily through the writing of his first falakiyah work in 1995.[4] The work became an essential marker in the documentation and institutionalization of Astronomy in Islamic Boarding schools, which was previously only taught orally or limited to small halaqahs. The decision to write it in the form of a book demonstrates an awareness of the importance of scientific codification as a strategy for preserving and disseminating knowledge among students.

Subsequently, the development of ilmu falak was systematically implemented at Pondok Islamic Boarding School Annuqayah, Guluk-Guluk, Sumenep, which is now widely recognized as one of the Islamic Boarding Schools with active and productive falakiyah activities in Madura. Unlike the previous model, Annuqayah did not incorporate ilmu Falak directly into the formal learning curriculum in schools/madrasas under the auspices of the Islamic Boarding School. However, the strategy of learning ilmu Falak was carried out through non-formal approaches, such as intensive training, seminars, regular discussions, and hisab-rukyat practices organized by Lajnah Falakiyah

Annuqayah.[5] This institution serves as a forum for Students who have a special interest in Ilmu Falak and wish to learn more about it beyond regular learning hours. This pattern reflects the Islamic Boarding School's spirit of openness to the intellectual interests of the students, as well as its flexibility in accommodating specific sciences that are not always part of the formal education structure. Through Lajnah Falakiyah, Ilmu Falak at Annuqayah is not only a scientific heritage, but also an arena for intellectual experimentation and practical students' devotion to the needs of the wider community, especially in determining the beginning of the Hijri month and other times of worship.

Thus, the history of Ilmu Falak's entry into the Madura Islamic Boarding School forms a unique chain of development. The process began with an authoritative figure, such as Religious leader Ahmad Dahlan, transitioned to open teaching by Religious leader Ghazali, and culminated in the formation of a formal institution in Annuqayah. This pattern shows that ilmu Falak in the Madura Islamic Boarding School did not develop instantly, but rather through a historical process that is evolutionary and rests on the central role of Islamic Boarding School figures.

B. Dynamics and Innovation in Teaching Ilmu Falak

The teaching of ilmu Falak at Madura Islamic Boarding School has undergone a significant transformation, coinciding with the development of technology and increased access to digital astronomical information. This dynamic marks a shift from the traditional yellow book-based approach to a more integrative approach, combining classical texts with modern digital-based tools. This innovation not only occurs naturally, but also in response to social demands and the practical needs of Muslims in determining times of worship more accurately and accountably.

In some Islamic boarding schools, innovation in teaching falak is evident using astronomy software, such as Winstars Accurate Times and Stellarium, to simulate the positions of the sun, moon, and stars. In some places, these applications are used not only to support hisab learning, but also to prepare for rukyat practice with a visual approach based on real-time sky simulation.[6] Students no longer only read data from manual tables, but began to access astronomical data based on local GPS coordinates, which strengthened the validity of their hisab and rukyat results. Its approach does not erase

the importance of classical falak books, such as Sullam al-Nayyirain, Addurul Aniq, and Irsyadul Murid. Instead, it makes them an epistemic basis that is then developed using modern tools.

In addition to the use of applications, the dynamics of teaching can also be observed through the integration of direct observation methods (*rukyat*), which are now packaged as scientific and experimental activities. For example, Pondok Islamic Boarding School Annuqayah holds *rukyatul hilal* towards the end of Ramadan and Dhulhijjah.[7] In this activity, students learn *rukyat* techniques both theoretically and through direct application in the field, including the use of optical tools like telescopes and theodolites. This activity encourages the development of strong analytical and empirical skills in students, who were previously more dominant in theoretical aspects.

Adaptation to social and technological developments also encourages the Islamic Boarding School to develop a digital documentation and publication system for the results of falak activities. Some *Lajnah Falakiyah* now actively publish their *hisab* results, *rukyat* reports, and prayer time schedules through social media, blogs, and YouTube channels. This transformation plays a significant role in expanding the reach of the Islamic Boarding School's scientific *da'wah* and strengthening its academic legitimacy among the wider community, including through participation in national forums such as the *isbat* session.

However, this innovation process still faces challenges, especially in terms of the availability of human resources who master astronomical software in depth, as well as the resistance of some circles to the use of digital approaches that are considered to shift traditions. Therefore, the dynamics of teaching *ilmu Falak* in Madura Islamic Boarding School reflect a dialectical process between conservatism and modernism, which methodologically characterizes Islamic Boarding School education: adaptive, selective, and based on the needs of the people.

C. Islamic Boarding School, Religious Leaders, and Ilmu Falak in Madura

The relationship between Islamic boarding schools, Religious leaders, and astrology in Madura represents the close relationship between religious authority, classical Islamic scientific tradition, and the social life of the community.[8] In Islamic

Boarding School, astrology is not only studied as an instrument of worship, but also as a medium for transmitting religious authority, especially in public issues such as determining the beginning of the lunar month. In this context, the role of Religious leaders becomes crucial, because people often trust decisions made by Islamic Boarding Schools more than those made by official state institutions.[9]

One Islamic Boarding School that stands out in this regard is Pondok Islamic Boarding School Al-Karawi in Sumenep, with an important figure such as the religious leader Ahmad Dahlan as its pioneer. Although falak is not taught as part of a formal curriculum to students, the practice of hisab and rukyat has long been a consistent part of the scholarly activities carried out by Religious leaders and Islamic Boarding School alumni. Al-Karawi's falak decisions, especially regarding the beginning of Ramadan and Shawwal, often differ from the results of the government's isbat session by one to two days.[3]

However, interestingly, the surrounding community tends to follow the decisions made by the Islamic Boarding School. It reflects the strong influence of Religious leaders' charismatic authority in Madura society. The choice to follow the Islamic Boarding School's decision is not based on methodological preferences alone, but also born from a high attitude of *tawadhu'* to the Religious leaders and respect for the Islamic Boarding School's scientific tradition, which is considered closer to spiritual values and sincerity in seeking the truth.[10]

This reality shows that in Madura, Islamic Boarding Schools are not only religious educational institutions, but also centers of social and religious authority that live in the collective consciousness of the community. The science of falak, in this context, serves as a bridge between classical texts, local authorities, and the practical needs of Muslims in fulfilling their religious rituals. Thus, the relationship between Islamic Boarding Schools, Religious leaders, and falak becomes a reflection of the continuity of traditional Islamic

epistemology, which remains adaptive and relevant in the context of contemporary society.

IV. Conclusion

Ilmu Falak has strong roots in the scientific tradition of Islamic Boarding Schools in Madura, particularly at Al-Karawi Islamic boarding school in Sumenep. Although it is not institutionalized in the form of a formal curriculum, the existence of ilmu Falak remains alive through the practice of hisab and rukyat carried out by Religious leaders and Islamic Boarding School alumni. The central role of Religious leaders in transmitting and practicing ilmu Falak makes the Islamic Boarding School the center of religious authority trusted by the community in determining times of worship, including the beginning of Ramadan and Shawwal. The Madura community's trust in the Religious leaders' decision on falak matters is more than just a methodological choice; it is based on an attitude of *tawadhu'*, respect for scientific authority, and a long-standing spiritual closeness between the community and the Islamic Boarding School. Thus, Ilmu falak in Madura serves not only as a scientific instrument for determining the time of worship but also as part of a socio-religious system that bridges tradition and contemporary needs. Islamic Boarding Schools, like Al-Karawi, are proof that ilmu Falak can continue to exist in a traditional space while addressing the dynamics of modern society.

References

- [1] Maskufa, Sopa, S. Hidayati, and A. Damanhuri, "Implementation of the New MABIMS Crescent Visibility Criteria: Efforts to Unite the Hijriyah Calendar in the Southeast Asian Region," *Ahkam J. Ilmu Syariah*, vol. 22, no. 1, pp. 209–236, 2022, doi: 10.15408/ajis.v22i1.22275.
- [2] S. T. Qulub, "Integrasi Astronomi dalam Ilmu Falak di PTAI dan Pondok Pesantren," *Al-Qanun J. Pemikir. dan Pembaharuan Huk. Islam*, vol. 21, no. 2, pp. 296–318, 2018, doi: 10.15642/alqanun.2018.21.2.296-318.
- [3] F. Rausi, "Awal Pasah dan Tellasan Pondok Pesantren Al-Karawi Kabupaten Sumenep dalam Pusaran Hukum Islam," *AL - AFAQ J. Ilmu Falak dan Astron.*, vol. 1, no. 2, pp. 139–156, 2020, doi: 10.20414/afaq.v1i2.1948.

- [4] K. Umam, "ANALISIS METODE HISAB GERHANA MATAHARI DALAM KITAB IRSYÂD AL-MURÎD," Universitas Islam Negeri Walisongo Semarang, 2014.
- [5] M. I. Rosyid, "STRATEGI PEMBELAJARAN ILMU FALAK DI PESANTREN (Studi Analisis Strategi Pembelajaran Ilmu Falak Lembaga Falakiyah Annuqayah Kepada Santri di Pondok Pesantren Annuqayah Guluk-Guluk Sumenep)," *JSP J. Stud. Pesantren diterbitkan oleh Pascasarj. Inst. Ilmu Keislam. Annu. Sumenep*, vol. 1, no. 2, pp. 157-173, 2022.
- [6] D. Pilendia, "Stellarium sebagai Media Pembelajaran Fenomena Astronomi: Kajian Literatur," *J. Ilm. Wahana Pendidik.*, vol. 8, no. 1, pp. 525-532, 2022, doi: 10.5281/zenodo.5899734.
- [7] Firdausi, "Lajnah Falakiyah Annuqayah Adakan Rukyatul Hilal 1 Ramadhan di Yogyakarta," PCNU Sumenep.
- [8] Shiddiq and Ahmad, "INTEGRASI AGAMA DAN SAINS (Tela " ah Pemikiran Konsep Pendidikan Islam Imam Jalaluddin As-Suyuti," *Kariman*, vol. 04, no. 02, pp. 1-18, 2016.
- [9] M. T. Ilahi, "KIAI : Figur Elit Pesantren," *Ibda' J. Kebud. Islam*, vol. 12, no. 2, p. 141, 2014.
- [10] R. Kutsiyah and I. Tianah, "Peran Sentral Kiai pada Masyarakat Madura : Studi atas Peran Kiai di Pondok Pesantren Raudhatul Qur ' an Pamekasan," 2025.