



# The Vaults of the Church of St. Michael the Archangel in Brixen Between Geometry, History and Missed Space

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## Abstract

Through the analysis of the vaulted system, the study aims to research the spatialities enclosed in the church of St. Michael the Archangel in Brixen (Bz): the current one surveyed, the gothic one and the painted baroque one, grafted onto the late-Gothic structure.

**Keywords** Vault system · Brixen · South Tyrol · Late-Gothic · Baroque frescoes

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**Fig. 1** The interior and the vault system of the church (photo by Andreas Manessinger). From left to right: the vaults over the chancel, the nave and the vaults with the counter façade and false dome

## Introduction

The work presented is part of a wider documentation campaign and analysis of the architectural heritage of the city of Brixen in the province of Bozen in South Tyrol, Italy. The parish church of St. Michael the Archangel is currently a church which, as in many other cases, has a baroque decorative apparatus grafted onto a late-Gothic structure (Ippoliti et al. 2017) (Fig. 1).

The aim of the study is the research of the spatialities enclosed in the church (the current one surveyed, the gothic one and the painted baroque one) that can be traced starting from the study of the vaulted system that is presented here. The development of the article will start from a historical framework, followed by the geometrical analysis of the vaults, their three-dimensional reconstruction, the study of the false dome frescoed above the choir, the three-dimensional reconstruction of Gothic and Baroque spatiality, and the conclusions.

## The Research

### The Church

The single hall church has a structure consisting of a first span, from which one enters the hall, which has an eighteenth century choir, three successive spans, occupied by pews for the assembly, all covered with a complex system of vaults the chancel, covered with an ogival cross vault, and the choir, covered with a half umbrella vault (Fig. 1).

The vaults are entirely frescoed and depict biblical scenes, saints' lives and, in the last span, a false dome (Fig. 6).

The first certain information of the place of cult dates to the eleventh century. Calamities or fires have repeatedly damaged or destroyed the building, so that,

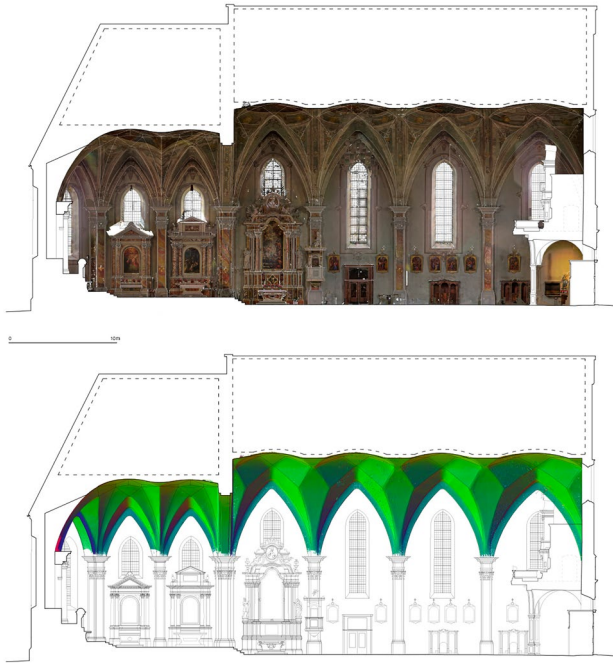
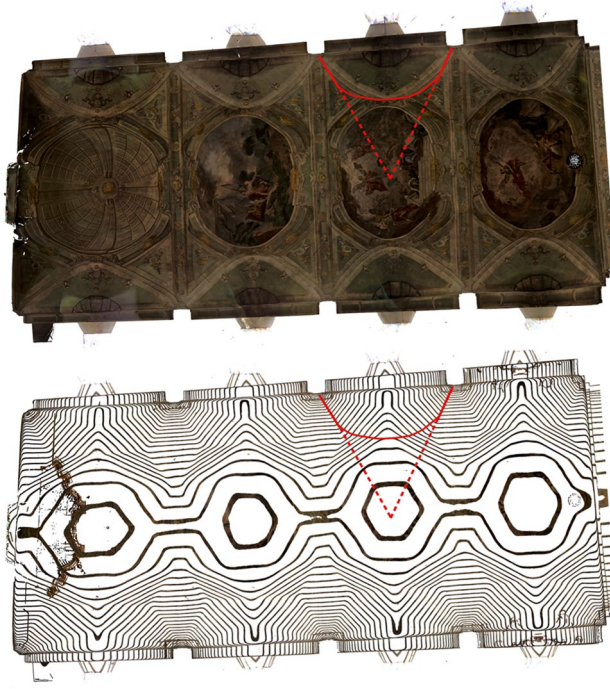


Fig. 2 Longitudinal section of the church booth as point cloud and ribbed vault diagrams



Fig. 3 Exploded axonometry of the architectural elements that make up the vault covering each bay



**Fig. 4** Top view of the point cloud of the vaulted system with the horizontal projection of the lunettes

probably in 1234, a new church was built. This three-aisled structure was devastated by a new fire in 1444. It therefore became necessary to build a new church, whose structure is the origin of the current one.

The present layout is the result of deeply Baroque reworking by the shepherd Johann Sebastian von Bach around 1749. He further enlarged the church by annexing the narthex which had been built with the late-Gothic church, creating the choir above the entrance portal (Gruber 1987).

The frescoes were painted by Josef Hauzinger (1728–86).

### **The Geometry of the Vaulted System**

The interpretative analyses of the scan data made it possible to understand the geometry of the vaults, made less evident by the frescoes (Bianchini et al. 2015; Cline et al. 2019) (Figs. 2, 3, 4).

After having isolated the portion of cloud corresponding to the vaulted system, we proceeded with the formulation of interpretative hypotheses based on characteristic sections extracted from the cloud (Ippoliti et al. 2017).

Through this analysis the geometric matrix of the church vaults emerged (Spallone 2016).

The vaulted system that covers the church nave is divided into four bays, separated from one other by pointed arches.

The analysis operations carried out on the point cloud have highlighted the presence of a hexagonal implant, which is difficult to perceive for the observer. Each bay therefore appears to be covered by a cloister vault on a hexagonal base, but without ribs. Regarding the latter, in fact, the archival documentation contains a reference to the request made by the frescoes' author to remove the ribs, to facilitate the painting of the surfaces.

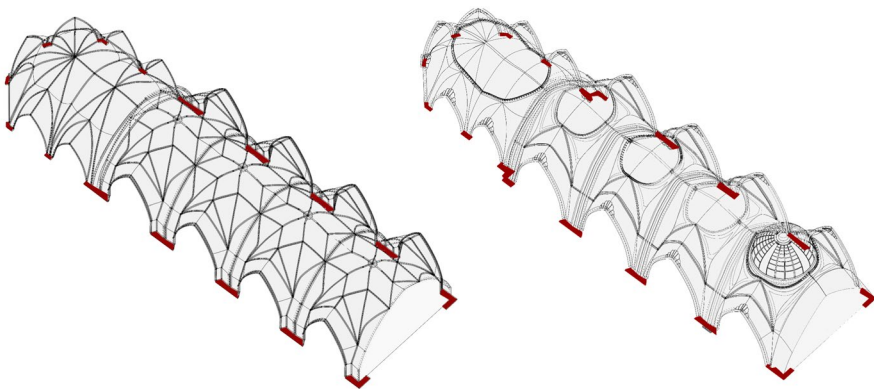
The absence of the ribs makes the intersections of the coives less evident, so the geometric conformation of the vault turns out to be less clear. The difficulties of interpretation are also amplified by the presence of a bevel in correspondence with the ribs which, increasingly accentuated as the height increases, turns the hexagon into a dodecagon (six sides plus six bevelled corners).

On each cloister vault there are two lunettes, one on each side, whose span covers the entire width of the bay. The analysis of the horizontal and vertical sections highlighted a composite geometry, consisting of a directrix formed by a pointed arch and two vertical cutting planes, symmetrical with respect to the axis of the lunette vault, which in the terminal part are cut by a fitting curve that reduces the lunette depth in plan. In this way, the plan projection of the lunettes is a union between a triangular and a circular projection.

The hexagonal vault, the lunette vaults and the arches are connected to each other through 4 pendentives.

### The Hypothesis of the Late Gothic Church and the Baroque Spatiality

After studying the vaults in their present layout, we studied the origins of the vaulting system by reconstructing hypotheses of late-Gothic and Baroque spatiality, whose intentions are expressed in the frescoes and *trompe l'œil* (Spallone et al. 2019).



**Fig. 5** Reconstructive hypothesis of: on the left, late-Gothic vaults and on the right baroque spatiality represented in the frescoes

At the starts of sixteenth century, the composite vaults had ribs, and the church image can be assumed to be similar to other churches built in South Tyrol in those decades: the Church of St. Magdalena in Vierschach (1470) has a structure similar, with a single aisle, ribbed pillars and star vaults; the Cathedral of Meran (vaults from 1450 to 1460) is a three-nave hallenkirche with ribbed star vaults; the Church of St Mary of the Swamp (Pfarrkirche) in Sterzing (first half of the sixteenth century); Parish Church of the Assumption of Mary in Sand in Taufers (first half of the sixteenth century) (AA.VV. 2016).

Assuming that the surfaces currently surveyed are those built between the end of the fifteenth century and the beginning of the sixteenth century, we hypothesized the presence of the ribs according to philological criteria, inspired by the churches listed above.

The result of this reconstruction (Fig. 5a) highlights that the pendentives have remained the same as in the baroque pictorial configuration, while the baroque interventions to remove the ribs had an effect mainly in the central area of the vaults.

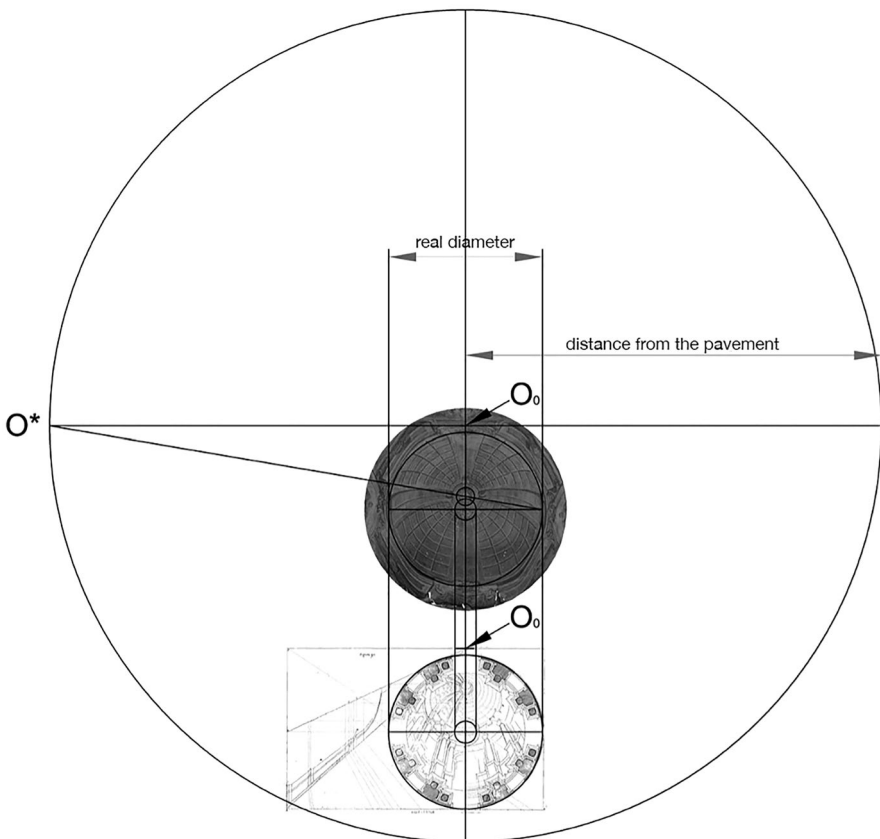


Fig. 6 Inverse perspective restitution of the false dome

The removal of the ribs gave Hauzinger the opportunity to paint the vaults as if they were continuous surfaces, with oval frames following the geometry of the bays. Hauzinger uses illusionistic effects to make the church space dynamic and open, up to the fake dome painted on the choir and the eighteenth-century organ.

What emerges is an ascending spatiality, open and fluid, rich in discoveries for the eye that runs through it.

This reconstruction leads us to hypothesize the spatiality in Fig. 5b that interprets the intentions of the baroque painter.

### The Painting of the False Dome

The false dome above the entrance is a horizontal perspective showing a dome with cross ribs and lacunars. The drawing originates from the well-known model of Andrea Pozzo published in his treatise “*Prospettiva de pittori e architetti*” (1693). However, unlike the drawing by Pozzo, in this false dome there isn't the drum (Fig. 6). The model, most probably, is the false dome that could be seen between the nave and transept of Brixen Cathedral, the frescoes of which were painted by Paul Trojer, Hauzinger's mentor, but in this case it is closer to Pozzo's model because it had a drum. All that remains of this example is a series of photographs from 1894 to 1895, because a later intervention replaced it with the fresco that can currently be seen in the Cathedral.

To compare the drawing in St. Michael church with the one by Pozzo, an orthophotos has been realised; then, considering the diameter of the false dome and its height in relation to the floor, a perspective restitution has been done; finally, the Pozzo's drawing has been scaled according to the false dome in St. Michael. This dome presents many similarities with the Pozzo's one, in particular the major elements of the perspectives correspond, and the position of the center of view O0 matches. Defining the height of the apex of the false dome, it is perceived as a hemispherical dome.

Of particular interest is the fact that the center of the vision corresponds to the arch between the first and second span, i.e. to the viewpoint of an observer turned with his gaze to observe the entrance of the church. This consideration goes hand in hand with the fact that the first entrance span is in part covered by the mezzanine which houses the wooden organ and the choir. These elements suggest how the false dome in St. Michael have been designed not only in order to suggest a space of greater height, but also to accentuate the scenic effect of the organ, with an all-Baroque result that combines spatiality and music: the observer, upon entering the church, turning to the call of music, comes to perceive the monumentality of the musical apparatus, enhanced by the perception of the larger-scale spatiality offered by the *trompe-l'œil*.

## Conclusion

The survey of the Church of St. Michael the Archangel made possible the analysis of the geometry of the existing vault, complex for its composition and its modification in the eighteenth century: a visually baroque and geometrically late-Gothic surface.

Moreover, the survey has made a spatial reading of further depth accessible: the late-Gothic structure and the Baroque painting overlap but maintain a certain readability and autonomy. This readability, made accessible by the laser scanner survey together with the high-resolution HDR capturing, has allowed us a distinct philological reconstruction of the two spaces that coexist in the church: the late-Gothic vaults and the Baroque space.

Digital technologies for the heritage often give the possibility to interrogate the heritage itself, which otherwise would not be fully comprehensible: in this case this contribution was decisive, and the results bring us to a level of knowledge of the Parish useful for its enhancement.

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## Declarations

**Conflict of interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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