Zircon Finance: Evolving Market Makers

Summary

Zircon is a DeFi ecosystem focused on unlocking previously untapped yield generation opportunities and simplifying them for the average DeFi user. Its core product is Zircon Pylon, a protocol that augments Uniswap V2 AMMs with single-sided liquidity management and impermanent loss mitigation.

The Zircon platform is initially composed of the Zircon Exchange, a modified implementation of Uniswap V2, and Zircon Pylon, the anti-impermanent loss platform. Zircon Pylon may be spun-off into an independent product that would serve other AMMs. However, integrating it with Zircon Exchange gives the maximum benefit thanks to lowered fees and special treatment to Pylon contracts. Zircon's primary home is Moonbeam and Moonriver, though it may develop secondary deployments on any number of smart contract platforms.

Reimagining Impermanent Loss with Pylon

Zircon Pylon virtually tranches the 50/50 Uniswap V2 portfolio (e.g. ETH/USDC) into **Float** (ETH) and **Anchor** (USDC) components. The system tracks the actual amount of assets supplied to the protocol and uses this information to "un-rebalance" the underlying pool according to two primary criteria:

- Any excess of Anchor tokens in the underlying pool (caused by Float growth and subsequent impermanent loss) is claimed by Float holders.
- Any excess of Float tokens in the underlying pool (caused by Float depreciation and impermanent loss) is claimed by the Anchor side.

This approach naturally adjusts the portfolio's effective target weights without compromising the ability of the underlying pool to provide liquidity for swaps. In the configuration defined in Pylon, the result is a shift of the impermanent loss curve to the right, reducing it on the upside and increasing it on the downside.

Perpetual Move

Zircon Pylon enables the creation of efficient pool token lending markets, which can be effectively turned into a form of no-expiry straddle we call Perpetual Move. While Pylon doesn't necessarily reduce IL overall, the Perpetual Move integration will — by providing additional income to LPs.

Token Economics & Governance

Zircon's token, ZRN, provides governance rights for Zircon smart contract parameters, as well as treasury management. ZRN is staked to obtain volume-based fee discounts and other bonuses, which are reset when unstaking.

About 60% of the ZRN supply is designed to be granted via airdrops, liquidity mining and treasury grants. The remainder will be split between Team (15% of total), Early Backers (15%) and a reserve pool for future employees (10% of total).

Pylon In-Depth

Zircon Pylon is a solution to two related problems in AMM liquidity provision. Currently, most AMM pairs are an uneasy combination of a relatively high risk asset and a stable base (e.g. ETH/USD, SUSHI/ETH).

The different volatility and risk profiles lead to the first issue of **impermanent loss** (better named as "divergence loss" due to its often permanent nature). In brief, the primary cause of IL is a portfolio's constant tendency to maintain the same relative weights. LP shares have negative gamma for the more volatile asset — exposure is decreased on the way up and increased on the way down.

As a corollary to the incompatible risk profiles, supplying liquidity effectively **halves an LP's capital efficiency**. Most investors and asset allocators have distinct high-risk/low-risk tranches in their portfolios. LPing forces users to create hybrid allocations by splitting their capital into two or more sides of the liquidity pool. This is suboptimal and effectively means a risk-on LP portfolio is always 0.5x leveraged, while a risk-off LP always needs to take on some exposure to a volatile asset.

Not all pools suffer from risk profile mismatch. For example, ETH/BTC-type pools usually have the highest liquidity precisely because the two assets have a similar volatility profile. Pylon offers little value to such pools, except for those who do not wish to gain exposure for one of the assets.

Pylon: Single-Sided Liquidity and Impermanent Loss Mitigation

The core insight behind Pylon is that the two risk profiles in AMMs can and should be separate. In the ETH/USD example, Pylon allows users to supply either ETH (the **Float** token) or USD (the **Anchor**). The two sides are joined internally, synchronously or **asynchronously** (it's possible to supply a 50-50 mix of assets and obtain only Float or only Anchor pool tokens).

Architecture

As the name suggests, Anchor tokens define the relative distribution of value. Anchor token holders have no claim to any price appreciation of the Float side, but they are also maximally protected from downside losses. The basic formula defining the relationship is as follows:

$$\begin{cases} FTV = TPV - ATV \ when \ ATV < TPV/2 \\ FTV = Fl_s * Fl_p \ when \ ATV \geq TPV/2 \end{cases}$$

Notes:

- FTV is the Float Token Value, or the total value of the claim available to Float token holders. This includes the fees due to the Float side.
- ATV is the Anchor Token Value, defined as the balance of Anchor assets supplied plus fees.
- Fl_s is the number of Float assets supplied (adjusted by fees), Fl_p is their price.
- TPV is Total Pool Value defined in the Anchor asset of this pool, e.g. USD but also ETH, DOT etc.

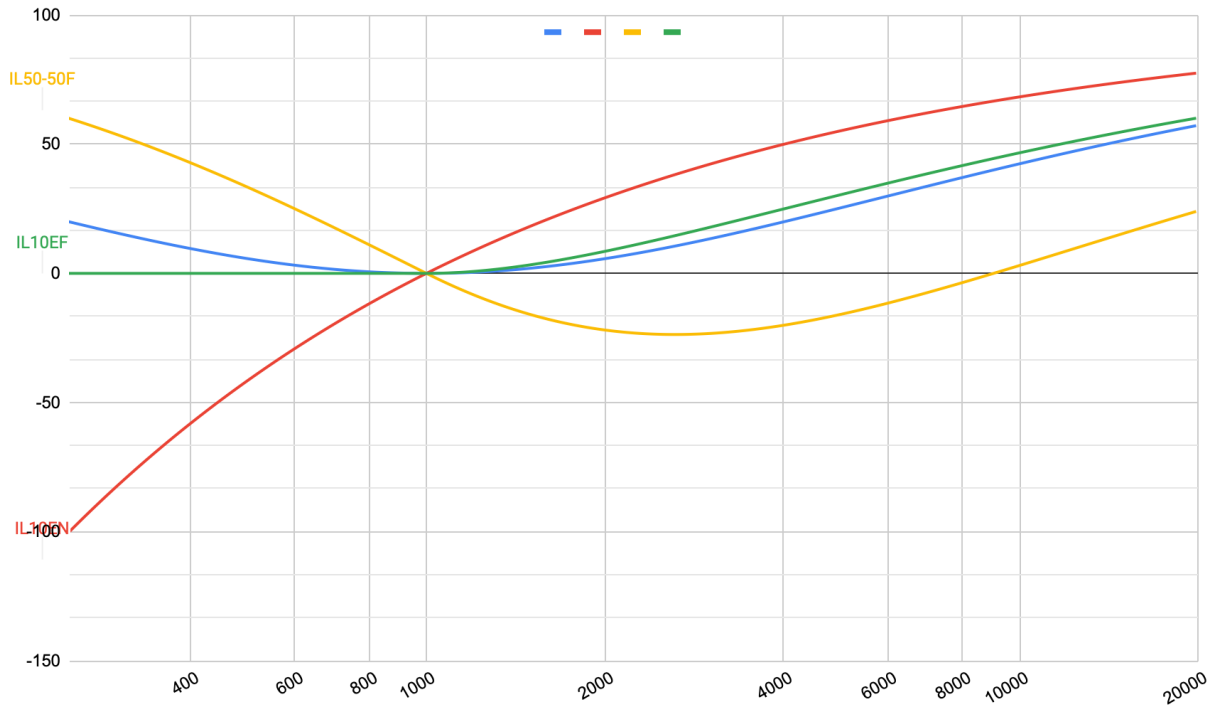
The FTV formula defines the protocol and is used to establish virtual balances of Float and Anchor tokens during withdrawal. In practice, this formula is expanded to consider fees based on the pool's k factor and relative weights of the two sides of the pool. More practical implementation details will be available in the Zircon Docs.

Functional Explanation

When the underlying pool increases in value purely due to appreciation of Float assets (ETH), impermanent loss will cause the pool to have more Anchor assets (USD) than before. By recording the initial Anchor balance and keeping it as a virtual variable — which would be completely unchanged in a no-fee, no liquidity change scenario — the system can know how much of that underlying Anchor surplus should still go to Float token holders during withdrawal.

Similarly, should the price go below the collective break-even point of the system, impermanent loss will force the pool to have more Float assets than originally supplied. The excess is provided to Anchor holders during withdrawal.

In a scenario where no assets are supplied, Float holders see precisely double the returns of a regular 50-50 AMM share with the same starting capital during upside, and zero impermanent loss compared to a 100% Float portfolio during price decline (but positive IL compared to a 50-50 portfolio benchmark, as here the benchmark's 0.5x leverage results in smaller losses).



Regular vs. Pylon impermanent loss (%) vs. a 50-50 reference portfolio (blue and yellow lines) and 100% portfolio (red and green lines).

The ability to provide liquidity asynchronously can offset the average break-even point. In theory, if enough Anchor holders were to provide fresh supplies and keep the pool at a constant 50-50 ratio as the Float rallied higher, the Float side would have zero impermanent loss through the entire range. However, resetting the break-even point in this manner also increases losses for Float if the market were to reverse.

In practice, the ability to provide Anchor/Float liquidity asynchronously makes the price of a Float share path-dependent. The protocol is nevertheless set up to naturally avoid negative outcomes (excessive accumulation of Float/Anchor liquidity) through inversely proportional fee distribution.

Pool bonds

When Float tokens decrease in value to the point where the Anchor liability exceeds half of the pool's total value, the system becomes technically indebted. To cover for this shortfall, the Pylon system will use a fractional reserve system. This means that any Anchor withdrawal that realizes the debt must be quickly covered for the system to remain solvent in the long-term.

In Pylon, the downside coverage is provided by a system of Pool bonds, i.e. claims on the future income of the pool. Each pool will have an associated auction ecosystem that enables it to

instantly issue new bonds and cover portions of liquidity that were extracted by Anchor withdrawals.

The bonds are issued in units of liquidity based on simple 50-50 pool tokens. Users will bid X units of present liquidity for a larger amount of future units of liquidity. Zircon bonds have a fixed yearly expiry, with the amount repaid at maturity including both the principal and premium over purchase price. Each pool will allocate a certain proportion of its fees for repaying the debt, and if it did not accumulate enough fees to repay its entire liability for one year, it will roll over the debt into the new year.

Overall, the liability incurred by the Pylon system is comparatively low. By only compensating a portion of the downside impermanent loss for the Anchor side, pools can realistically recover from “apocalyptic” downside scenarios such as the March 2020 crash, even if the Float asset’s price does not recover. However, the pool can still fail if the Float asset’s return tends to -100%, and if not enough funds can be raised through the bond auctioning mechanism. In this case, the Anchor liability will be progressively slashed once it reaches a significant percentage of the pool’s total liquidity. It is thus entirely possible for Anchor holders to lose even 100% of their capital, similarly to bondholders when the issuing entity goes bankrupt.

Governance

Zircon governance will be able to set key parameters of the Zircon Pylon system (and other products). It will also have complete discretion on the Zircon treasury spending via a flexible grant system.

The Zircon smart contracts are designed to be immutable once deployed and tested. This means that Zircon governance will be unable to change core protocol logic or shut down the protocol.

Zircon governance will be initially conducted through Snapshot off-chain governance, and executed by a trusted multisig committee. The system will eventually be upgraded into full on-chain governance based on a governor smart contract that will replace the multisig.

Platform and Token Economics

Fees for using Zircon

By default, Zircon Exchange levies a 0.15% fee on each trade. Users can further reduce the fee by staking ZRN into special fee contracts. Depending on the volume they’ve accrued, they will obtain a discount for swaps. Unstaking assets resets their volume counter, meaning that they will need to re-generate the same volume to get back the tier they lost.
The Zircon protocol routes 20% of swap fees into the on-chain Zircon treasury.

The lower base swap fee is enabled by the Pylon system. With LPs not suffering IL as much as normally, it is possible to entice traders with lower fees at a sustainable pace. The specific parameters are governed by Zircon Governance and can be adjusted to fit the community's needs. We anticipate that reduced fees will have an overall positive impact on pool revenue, primarily due to more frequent appearance of arbitrage windows and generally higher amounts of trading volume.

Pylon Fees

The Pylon system charges entry and exit fees during normal operation. The initial parameters are 0.1% for entry and exit, though these are raised during critical periods to disincentivize behavior that puts the pool at risk (e.g. withdrawing Float/Anchor liquidity when the system is indebted, or supplying asynchronously when the system is imbalanced).

Pylon revenue is entirely routed to the Zircon treasury.

B2B Fees & Liquidity Incentives

Core to the success of an AMM DEX is the ability to incentivize trading for the long-tail of assets. Traditionally, this is done by token emission and farming. Thanks to the Zircon Pool Bond system it's possible to use debt financing to cover these incentives, turning them into a sustainable tool whose cost is borne by the protocol, and not the token holders.

Due to the risk incurred by the protocol, however, incentives can only be generated by posting a similarly valued bond of ZRN tokens. If the pool where the incentives were directed to turns a profit vis-a-vis the incentive value, this bond can be withdrawn. This helps align incentives between partners and the exchange, and defaults to a listing fee benefitting ZRN holders should the pool fail.

Zircon Treasury

The Zircon treasury will operate through a permissionless grant model that is voted on by the community of ZRN holders. Anyone is able to submit a proposal for review to improve the protocol, or any other usage of the treasury deemed necessary by the holders.

Proposals will initially be executed by the multisig, though the governor smart contract is expected to automate this function as the protocol matures.

The treasury will naturally be composed of reserve ZRN and pool tokens for the Exchange and Pylon pools. These may be redeemed if necessary as part of the execution of a grant. In addition to disbursement grants, Zircon Governance may pass proposals to manage the internal composition of the treasury.

There are no hard-coded caps for the Zircon treasury, which is expected to grow in size as protocol usage increases. It will be up to the Zircon Governance community to potentially reduce inflows if deemed preferable.

Roadmap

Zircon's general aim is to create a full-stack ecosystem of maximally passive yield generation tools.
A use case that's been so far unexplored in DeFi is borrowing the AMM pool tokens themselves. We will show how this can fundamentally solve the mismatch inherent to impermanent loss.

AMM LP Shares as Options

When discussed with the terminology of options (the derivative product), AMM LP positions are short gamma. This means that their delta (the change in portfolio value for a given change in the underlying asset's price*) decreases as the price goes up and increases as it goes down.
*e.g. Holding 1 BTC results in a delta of 1.0 wrt BTC price, short selling 1 BTC confers -1.0 delta. Holding 0.5 BTC means having 0.5 delta.

This is the phenomenon responsible for impermanent loss and it is precisely the opposite of convexity, the mathematical concept underpinning the attractiveness of options as a hedging/trading tool. Buying an option puts users into a long gamma position, which means their delta increases as the trade goes further in their favor, and decreases as the trade turns out to be wrong.

How can we turn a short gamma LP position into long gamma? Quite simply, by **borrowing the token and redeeming it**.

Long gamma positions always make money if there is no cost or "drag" to staying in the position, which is why options have theta (time value) decay. If a hypothetical money market for LP shares existed, it could easily substitute this decay with considerable interest rates for borrowing LP shares.

Zircon's Perpetual Move

AMM tokens make for excellent candidates for borrowing in a money market to create a type of exotic option.

Borrowing an LP share and redeeming the underlying asset would effectively create an option straddle, i.e. a position that makes money if there is strong volatility to either side. This happens due to the inherent short gamma position of the LP share. If price moves up, the redeemed tokens will be growing faster in value than the debt position denominated in Float tokens. If price moves down, the debt position will be shrinking faster than the redeemed assets.

Crypto traders may be familiar with the straddle mechanism in the form of the Move contract, tradable on some exchanges. This is why we refer to Zircon's solution as the Perpetual Move.

The Perpetual Move is an exotic financial tool due to its radically different structure compared to standard options. For example, it is strongly path-dependent. The effective strike of the Perpetual Move is the price at the moment of redemption of the Float pool share. The Perpetual Move is designed to improve the liquidity providers' returns. By capturing the significant interest rates paid by pool token borrowers, they can further offset impermanent loss — especially if the value of their assets drops.

From a perspective of pool and protocol health, Perpetual Move traders will pay significant interest and cover the AMM fees. Furthermore, **successful trades do not extract value from LPs per se**. Given the assumption that trades on Zircon and the creation of the Perpetual Move position do not impact the price of the underlying asset, the profit made by a Perp Move trader would have left the pool regardless (through arbitrage profits).

As a new financial primitive, Zircon's Perpetual Move will be rolled out gradually and be opened for academic and community feedback before launch.

Token Distribution

The majority of ZRN tokens will be distributed at or shortly after genesis, with 40% of total supply reserved to early backers, team and future employees, and the remaining 60% distributed openly.

Community

The 60% portion intended for open distribution will be segmented as below:

- 30% (18% of total supply) will be distributed within the first few weeks of launch.
- 15% (9%) will be distributed within 12 months of launch.
- 25% (15%) is reserved for liquidity mining initiatives.
- 30% (18%) is a long-term reserve held by the Zircon treasury.

Token Vision

The ZRN token distribution is designed with both short-term and long-term health of the protocol in mind. We believe that the users, not the whales, should be incentivized the most to participate and steward the protocol.
Indeed the primary use case of ZRN is that of aligning incentives across participants, using it to re-introduce a form of "positive platform lock-in" where users and partners are incentivized to grow and use the protocol for their own benefit.

The protocol will preserve the ability to mint additional tokens and create persistent inflation if necessary. While this is unlikely to be required in the near future, and potentially ever, it is preferable to maintain this option for future unforeseen needs.